TransCell 1900TM
System Installation & Integration Manual

Document No. 1000462

March 20, 2001

Revision A

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REVIEW AND CONCURRENCE

C. Straw - Signature on File	04/13/01
CHRIS STRAW, SYSTEMS ENGINEER	DATE
T. Hebert - Signature on File	04/24/01
THOMAS HEBERT, DIR, DIGITAL TECHNOLOGIES	DATE
T. Hebert for S. Maniglia - Signature on File	04/24/01
STEVE MANIGLIA, TDMA PROJECT MANAGER	DATE

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1.0 SCOPE

This document defines the installation requirements for the TransCell 1900TM, Transcept's six-carrier TDMA-over-microwave system. Throughout this document the acronym SCCS (Self-Contained Cell Site) is used to refer to a base station. The SCCS is a cabinet that contains a base station. The terms *donor* and *donor site* refer to the TransCell 1900TM Hub units, reflecting their function of "donating" sectors from the SCCS to the Remote unit(s). The terms *repeater* and *repeater site* refer to the TransCell 1900TM Remote units.

1.1 REFERENCE DOCUMENTATION

- Transcell 1900 TM SEM / HUI User's Guide Document No. 1000483
- Transcell 1900 TM Product Specification Document No. 1000143
- Transcell 1900 TM Maintenance Manual Document No. 1000497

2.0 PRODUCT SPECIFICATIONS

The TransCell 1900TM system specifications are contained in Transcept Document No. 1000143, *TransCell 1900TM TDMA-Over-Microwave System Product Requirements.*

3.0 ASSET RESPONSIBILITY

Transcept: Each system (Hub-Remote Pair) that Transcept ships shall consist of the following items:

a. One Hub Assembly (Transcept part # 1000101 *or* part # 1000225)

> **NOTE**
>
> The donor site will only have one Hub cabinet for all installations. Each Hub cabinet can control two Remote cabinets (repeaters). Hub Assembly 1000101 is configured to control one repeater, while assembly 1000225 is configured to control two repeaters. Hub assembly 1000101 is upgradable to assembly 1000225.

b. One Remote Assembly (Transcept part # 1000102)

c. Two Microwave parabolic antennas with radome (Transcept part 1920006P001, 1920006P005, 1920006P004), radius defined by curves outlined in the TransCell 1900 TM Product Specification. See Appendix A.

Customer: The customer shall be responsible for providing the following:

a. A sweep of the local 5.8 GHz ISM unlicensed band is necessary to identify and avoid signal interference at the Data-Link Antenna of both the Hub and Remote sites.

b. NOCC/OSS Site Number of Remote location.

c. All RF jumper cables needed to connect the Transcept system to the tower and SCCS.

d. All RF cables that run up the tower for the PCS antennas (typically 1 5/8" diameter cable; refer to recommended cable parameters in paragraph 4.2.)

NOTE

The maximum allowable gain of the PCS antennas being used is equal to 16 dBi plus the loss value of the cabling between the antenna and the antenna terminal on the Remote cabinet (Typically 3.5 dB). This ensures that maximum peak E.I.R.P. will not exceed 1640 watts per FCC 47CFR 24.232.

e. All RF cables that connect to the data link antenna(s). (Cable diameter of 5/8" is required, Andrew LDF4.5-50 or equivalent. See Appendix A for data link antenna installation options.) If other cable is used:
   1) RF loss must be the same or better than Andrew LDF4.5-50 at 5.8 GHz.
   2) VSWR must be the same or better than LDF4.5-50 at 5.8GHz.

f. Materials and Electrician to wire the Hub and Remote cabinets to electrical service as described in Paragraphs 4.6 and 5.5.

g. Tower crews to mount antenna(s) and RF cables on tower.

h. At each site with a Hub cabinet (donor site), if not already done, the CSU must be upgraded to a CSU/DSU (Channel Service Unit/Data Service Unit), Kentrox 72651 or equivalent.

i. V.35 cable for CSU/DSU, Kentrox part # 95010054. **Note**: The '010' in the part number specifies a 10-foot cable length.

j. 25-pin D-shell extender (straight through, plug to receptacle) to connect part # 95010054 to the Hub V.35 interface 25-pin D-shell via conduit, where necessary. This cable cut to length per installation and D-shell plug connected after cable passed through conduit.

k. Router (Cisco 7204, or equivalent) and DSU/CSU/T1 interface (Cisco PA-MC-4T1, or equivalent) installed at repeater-associated switch to transmit repeater status information on the customer's network.

l. Network configuration that includes two IP addresses for each Hub/Remote Pair (HRP).

m. Modification of base station parameters where appropriate. See Paragraph 8.1.

n. Removal of all quarter-wave lightning arrestors if in series with PCS RF lines.

o. Labor to install TransCell 1900TM cabinets on site.

p. Executing all other installation procedures included in this document. Alternatively, Transcept provides installation service packages. For more details, contact your Transcept sales or field representative.

4.0 REMOTE SITE INSTALLATION

The following section covers the site installation requirements for the Remote unit (repeater site).

4.1 TOWER TOP VIEW

Figure 1 is an overhead view of the Remote site with respect to a highway. The two sectors shown transmit and receive the same information due to the signals being split in the

Remote Assembly. Each antenna is used to transmit and receive RF signals, instead of having two receive antennas and one transmit antenna. The Remote site shown here utilizes the same mounting pad as an SCCS. The Remote cabinet has an option that allows the repeater site to have three-sector capability.

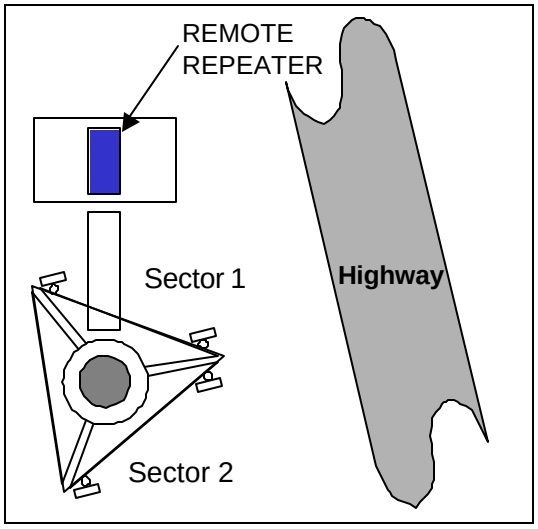


Figure 1. Overhead View of Remote Site

4.2 REMOTE CABLING REQUIREMENTS

Figure 2 is a diagram of the cabling requirements for the Remote sites. The configuration shown provides corridor coverage. Unlike a standard 3-sector system, which provides a unique channel for each sector, the TDMA-Over-Microwave system transmits the same information in both directions. In Figure 2, the Sector 1 and 2 designations are used to identify the location of components on the tower. Table 4.1 also defines the required connectors, tower-top LNAs and cable lengths.

Table 4-1 lists the recommended parameters for tower cables, jumper cables, and data link cables. When selecting tower cables, bigger is better in terms of propagation losses, but not for weight and wind loading. Table 4-1 defines the minimum diameter of cable required in order to minimize wind and weight loading on the tower and still meet TransCell 1900TM system requirements. All RF connections to the Hub or Remote cabinet shall not exceed a voltage standing wave ratio (VSWR) of 1.5:1.

When using the 3-sector option, another sector's worth of cable materials must be added.

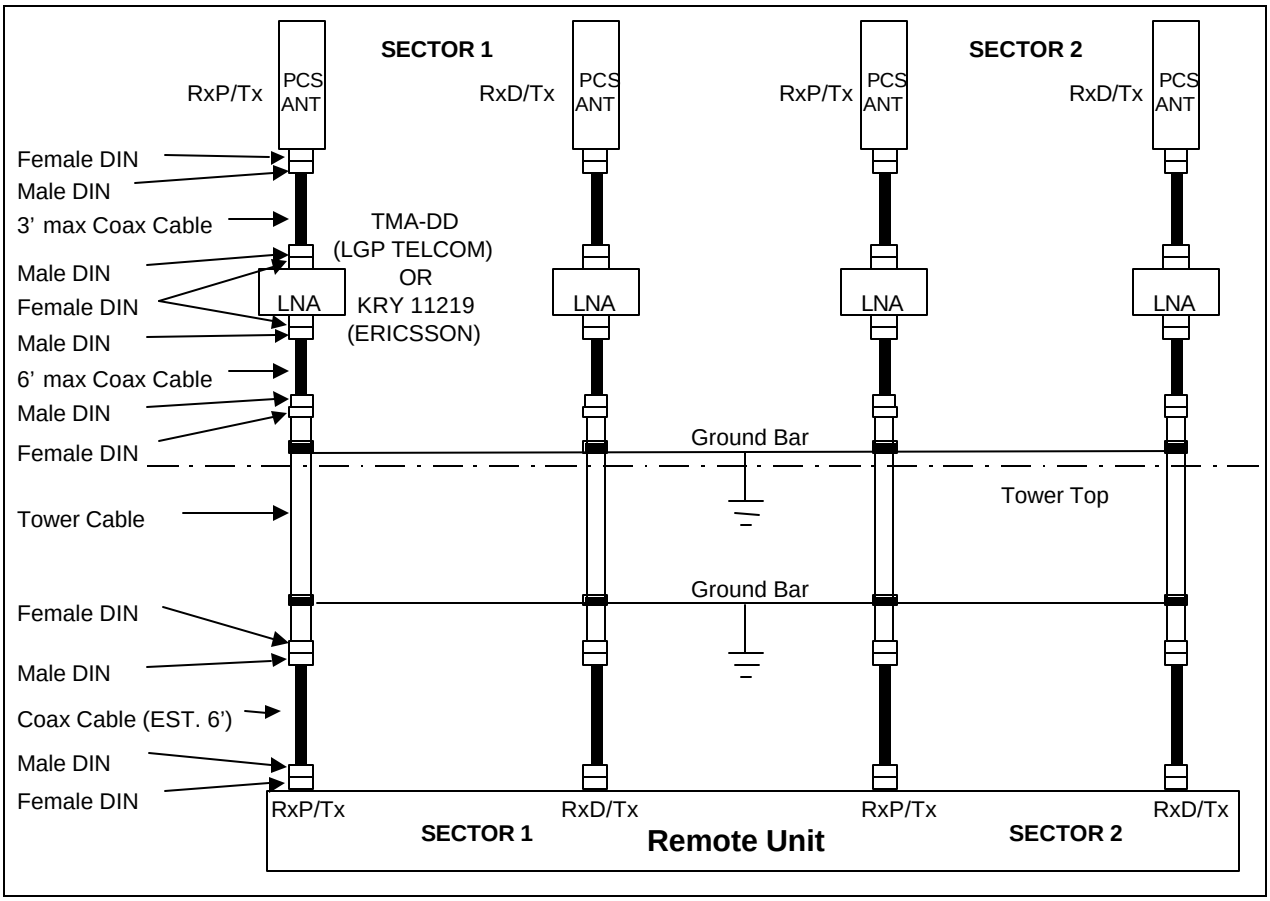


Figure 2. Tower Cabling Requirements

Table 4-1. Tower Cable Definition.

PCS Tower Cable			
Cable Length (ft.)	**Cable Diameter (in.)**	**Max Cable Loss (dB)**	**Cable Type (Andrew)**
< 170 feet	7/8	3.35 dB	LDF5-50A
170–231feet	1-1/4	3.35 dB	LDF6-50
231–268 feet	1-5/8	3.35 dB	LDF7-50A
268–316 feet	2-1/4	3.35 dB	LDF12-50
Jumper Cable			
3 foot	1/2	0.2 dB	LDF4-50A
6 foot	1/2	0.4 dB	LDF4-50A
Data Link Cable			
<250 feet	5/8	Refer to Appendix A, Figure A-1 for margin requirements	LDF4.5-50A

4.3 MICROWAVE DATA LINK CABLES

Figure 3 depicts the cable interconnects between the Remote Assembly and the data link antenna. The tower cable is Andrew cable type LDF4.5-50A. The maximum allowable cable loss for each LDF4.5-50 cable with connectors is defined in Table 4-1. The cabling of the microwave data link is the same for the Remote site as is for the Hub site. Note that the antenna requires N type connectors instead of DIN type connectors. See Appendix A for more data-link antenna installation options.

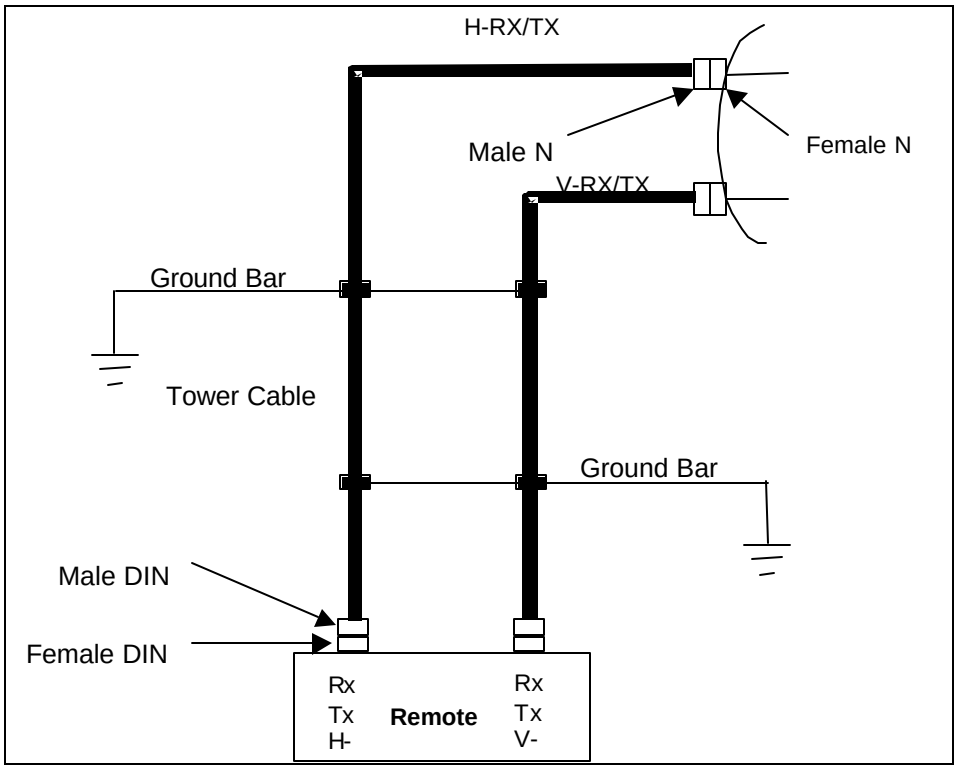


Figure 3. Microwave Data Link Cables

4.4 DATA LINK ANTENNA CLEARANCE

Figure 4 depicts the minimum spacing from the PCS antennas to the data link antenna. The clearances from the PCS antennas to the data link antenna take into account the possibility that the PCS antenna may overhang the data link antenna. The clearance from the top of obstacles to the bottom of the antenna is a requirement that applies to the entire path from the Remote site to the Hub site. The required clearance is specified in Document No. 1000143, Table 4, Data Link Requirements.

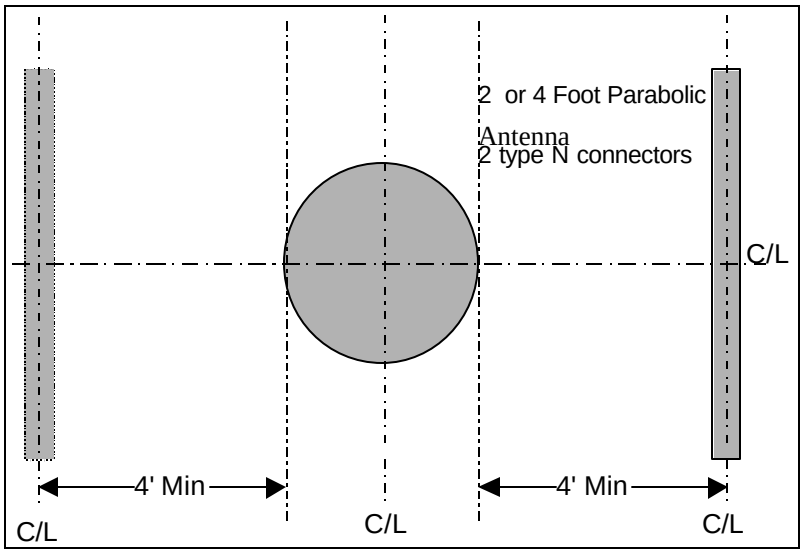


Figure 4. Data Link Antenna Clearance

4.5 REMOTE ASSEMBLY INTERCONNECT

Figure 5 is an interconnect diagram between the Remote Assembly and tower cables. The dashed line indicates that the cable will be routed through underground conduit. The RF lines shown are Andrew cable type LDF4-50A with the appropriate terminating connectors. Refer to Table 4-1 for allowable cable loss.

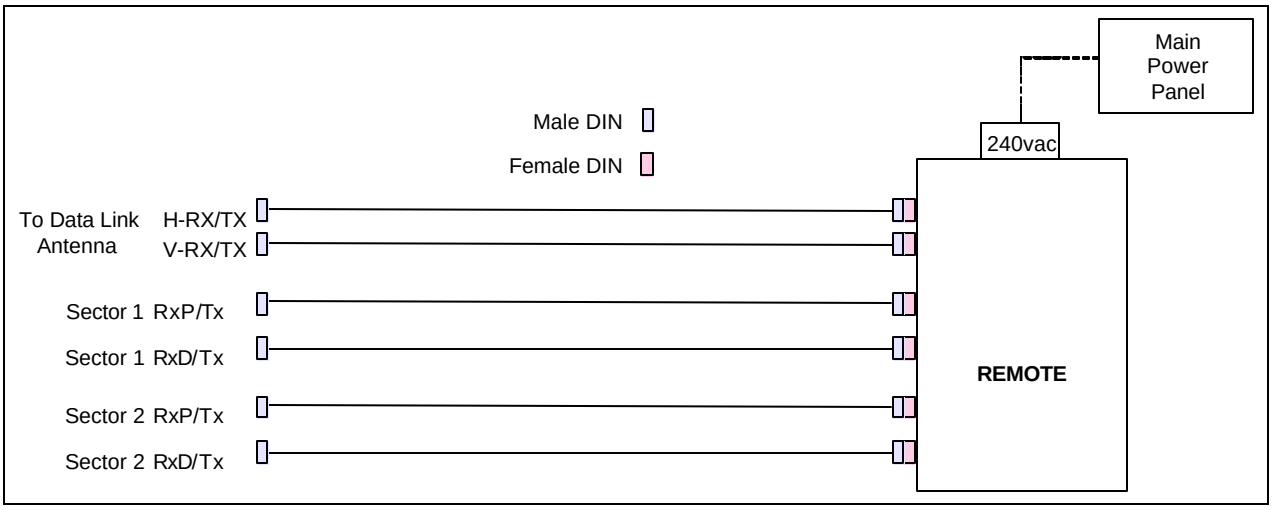


Figure 5. Remote Interconnect Diagram

4.6 REMOTE PRIME POWER FEED

Figure 6 is a diagram of the prime power distribution for the Remote site. The Remote Assembly is a standalone unit with its own 125-amp, 240-VAC power panel. Included in the prime power panel is:

- 40 amp, 2 pole Main Breaker
- 40 amp, 2 pole Auxiliary Breaker,
- Surge Arrestor
- 15 amp, 1 pole AC Outlet Box breaker
- 40 amp, 2 pole PDU breaker

Input prime power requirements are specified in Document No. 1000143, Table 7, Mechanical/Environmental/Safety Requirements.

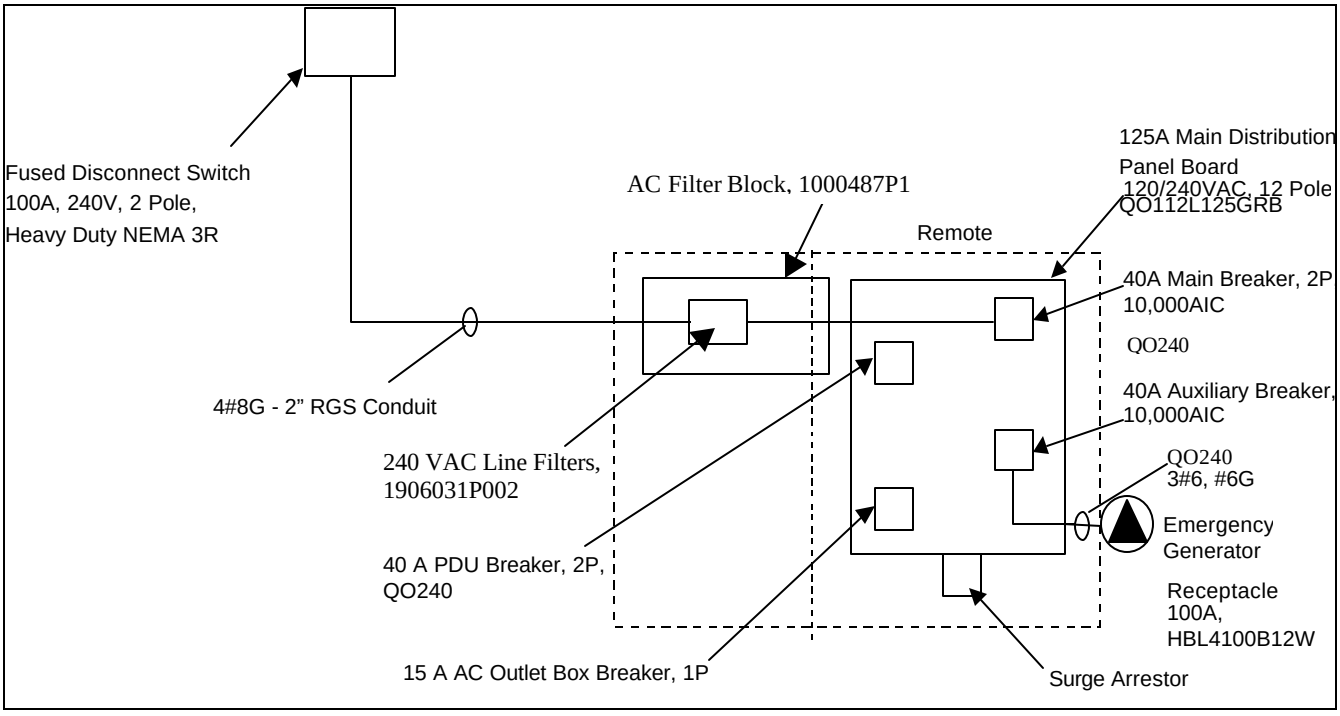


Figure 6. Remote Site Prime Power

4.7 REMOTE ASSEMBLY OUTLINE DIMENSIONS

Figure 7 is an outline drawing of the Remote Assembly. The main interfaces are the Emergency Generator Receptacle, 125 Amp Service Panel and eleven RF ports. The Remote Assembly has its own service panel for distribution of power. The emergency generator receptacle allows the Remote Assembly to be powered from an external generator. To use this capability, the generator circuit breaker must be placed in the ON position. When the generator circuit breaker is ON, the main breaker is turned off, and power flows from the generator to the Remote Assembly.

The base of the Remote Assembly is depicted in Figure 8. The base is bolted to the cement pad first and then the cabinet is placed on it and bolted down with 1/2-inch nuts.

The RF ports are used to interface the Remote Assembly to the PCS Antennas and Data Link Antenna. Even though three connectors are shown for each sector, only the RxP/Tx and RxD/Tx ports are used in sectors 1 and 2. Sector 3 is an optional sector that is used when three-sector coverage is needed. The Tx port in each sector is used only when the 12-carrier option is implemented. Figure 9 is a diagram that depicts the spacing of the DIN connectors on the Remote cabinet.

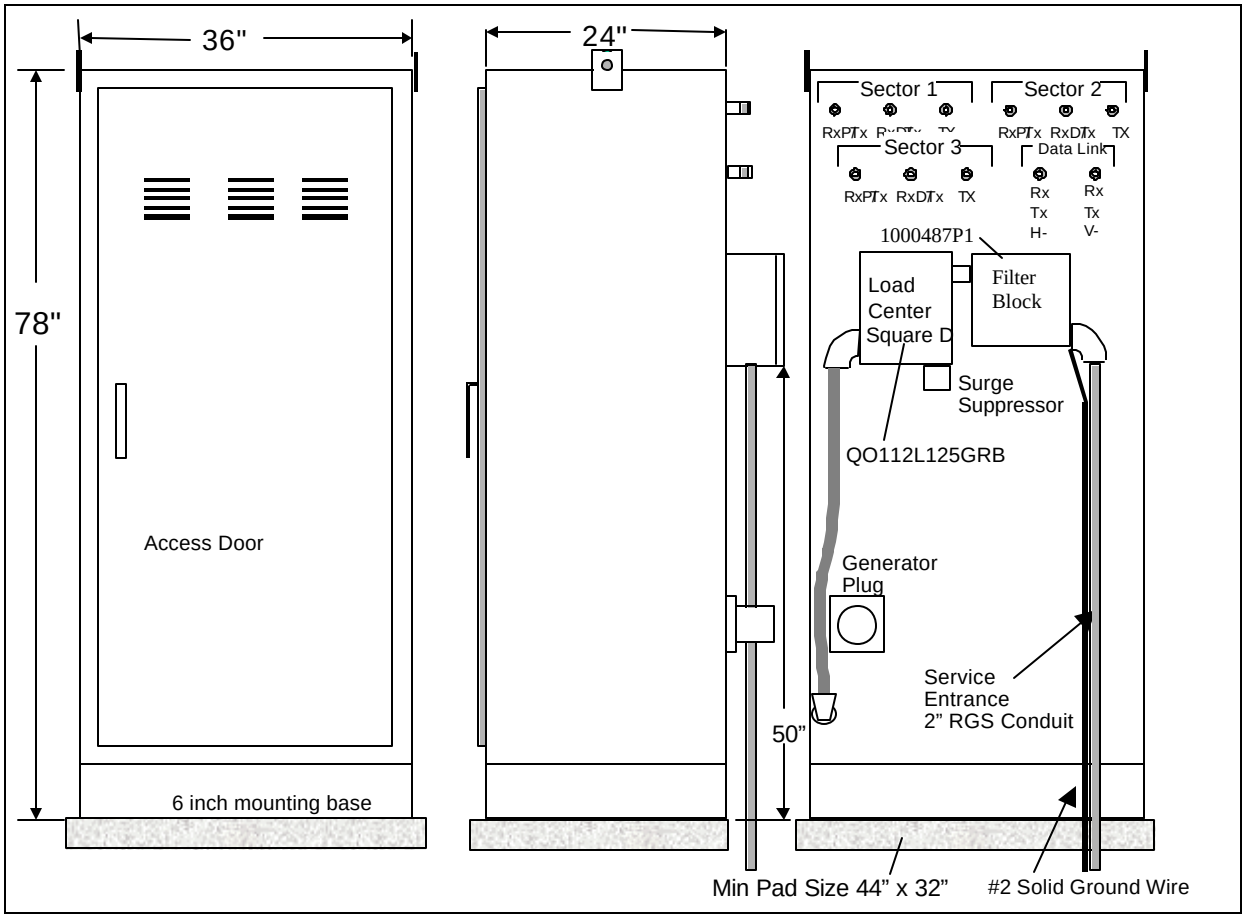


Figure 7. Remote Outline Drawing

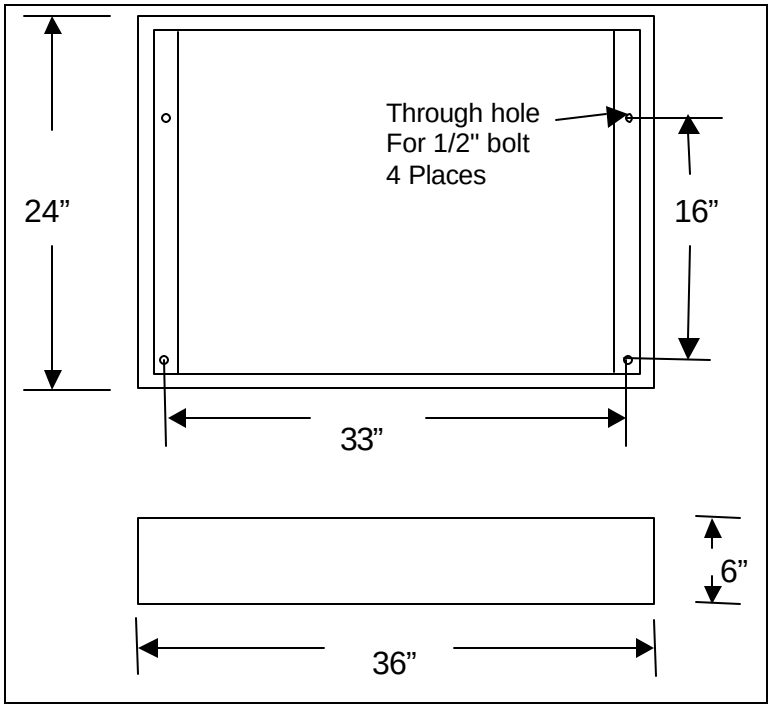


Figure 8. Remote Mounting Base

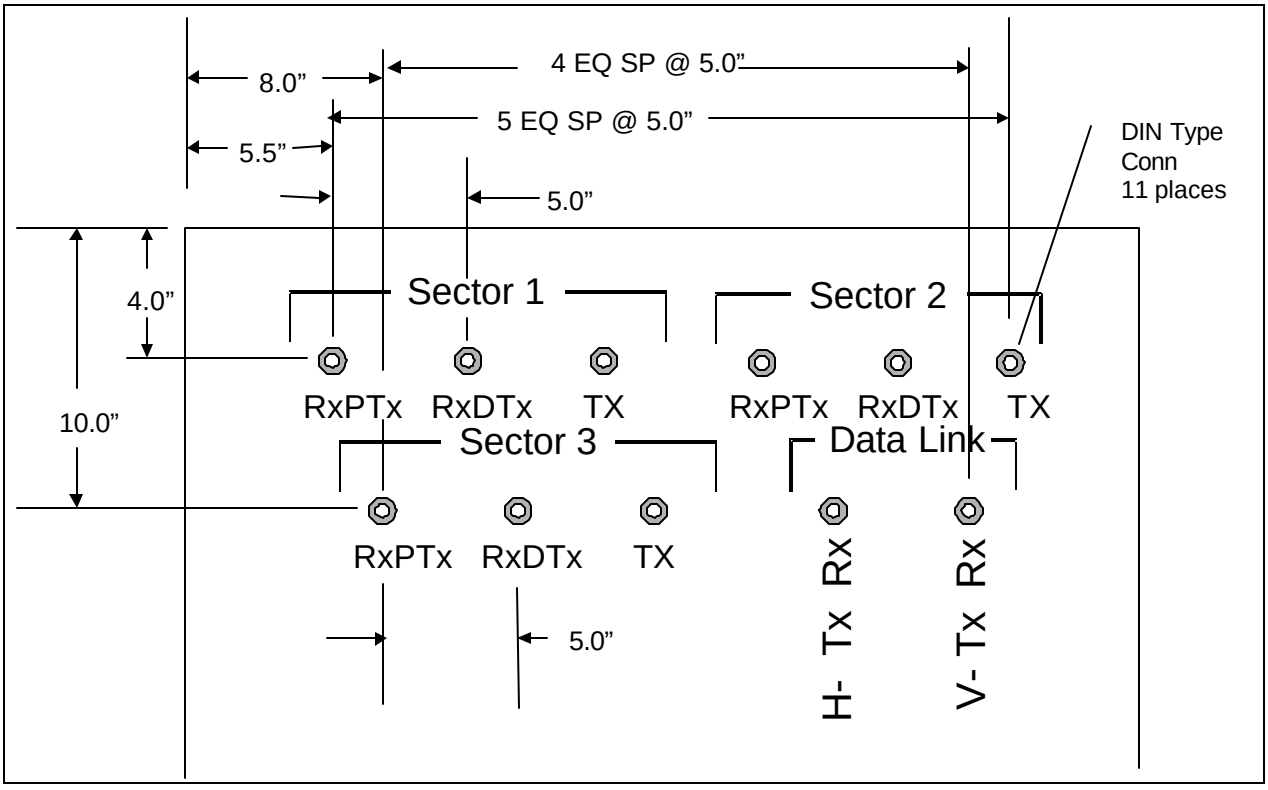


Figure 9. Connector Spacing

5.0 HUB SITE INSTALLATION

The following section covers the site installation requirements for the Hub unit (donor site).

5.1 TOWER TOP VIEW

Figure 10 is an overhead view of the Hub site with respect to a highway when an SCCS is used. The unit can also be installed inside a shelter or outside the shelter. The two sectors shown transmit and receive the same information due to the signals being combined and split at the SCCS. One antenna is used to transmit and receive RF signals and the other antenna is used for receive only. The third sector in the SCCS is utilized to interface to the antennas at the donor site. The first and second sectors in the SCCS are donated to the repeater sites.

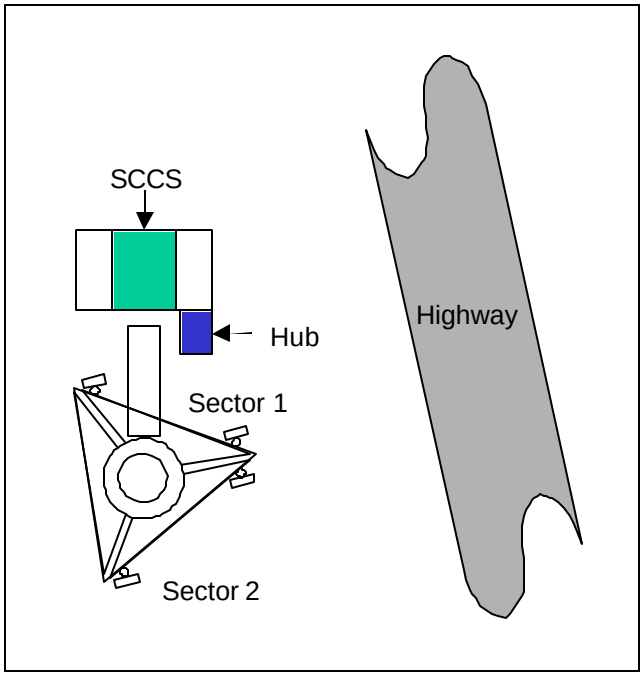


Figure 10. Overhead View of Hub Site

5.2 HUB CABLING REQUIREMENTS

Figure 11 is a diagram of the cabling requirements for the Hub sites. The configuration shown provides corridor coverage for a non-duplexed SCCS to Hub interface. Unlike a conventional SCCS system which provides a unique channel for each sector, the SCCS transmits the same information in both directions via the PCS antennas (Sector 1, Sector 2), meanwhile feeding signals from its other two sectors to the Hub cabinet for data link transmission.

Figure 11 also defines the required connectors, tower top LNAs and cable lengths. The customer determines the type of tower cable (Table 4-1 should be used as reference). Also depicted in the diagram are the duplexer and splitters that the customer must configure with the SCCS to provide corridor coverage. The customer will also have to ensure that the SCCS can power the tower-top LNAs.

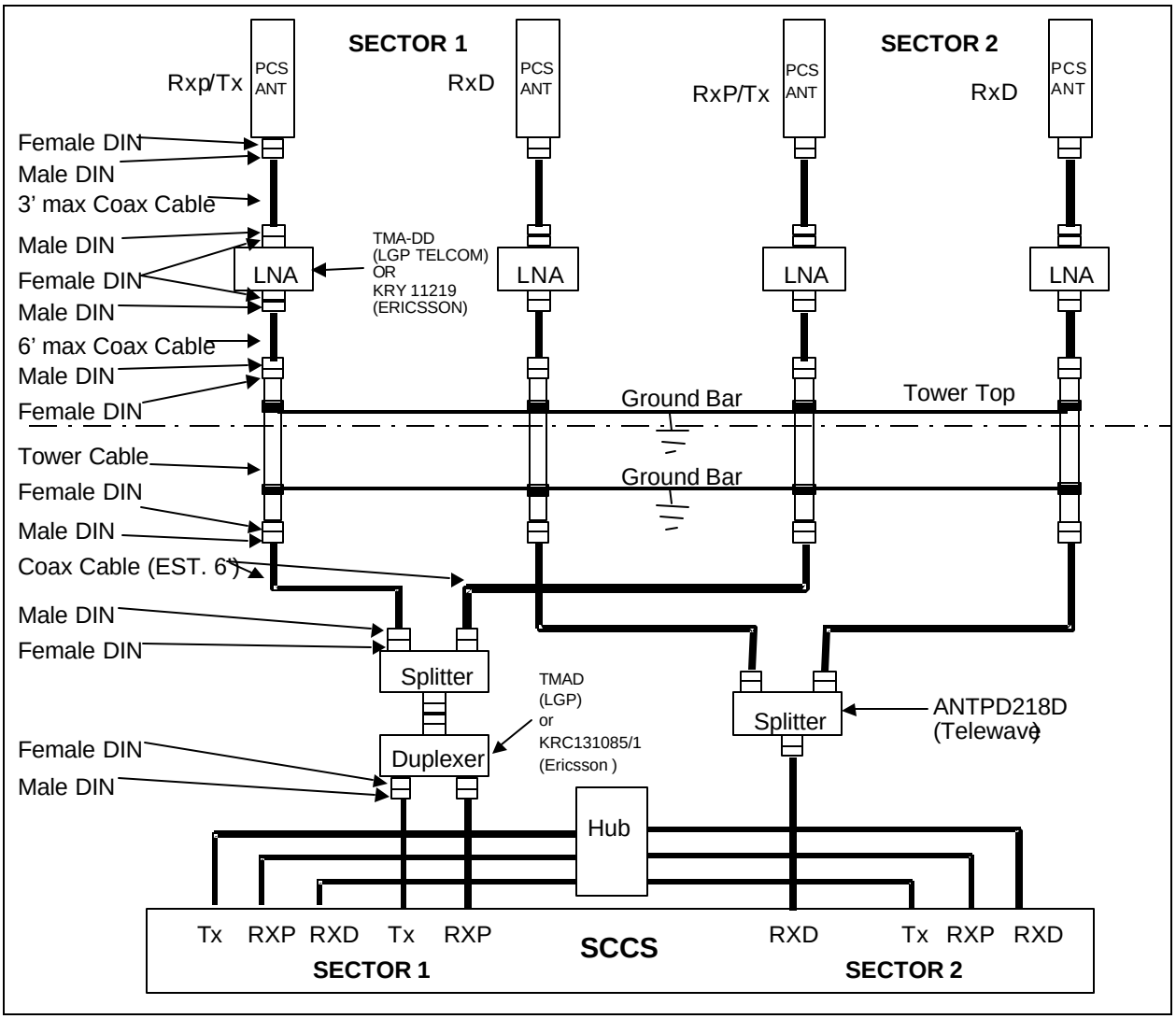


Figure 11. Cabling Requirements for Hub Site

5.3 HUB ASSEMBLY INTERCONNECT

Figure 12 is an interconnect diagram between the SCCS, Hub cabinet and tower cables. The dotted signal lines indicate that the power line will be routed through conduit. The remaining RF lines are Andrew type LDF4-50A with the appropriate terminating connectors.

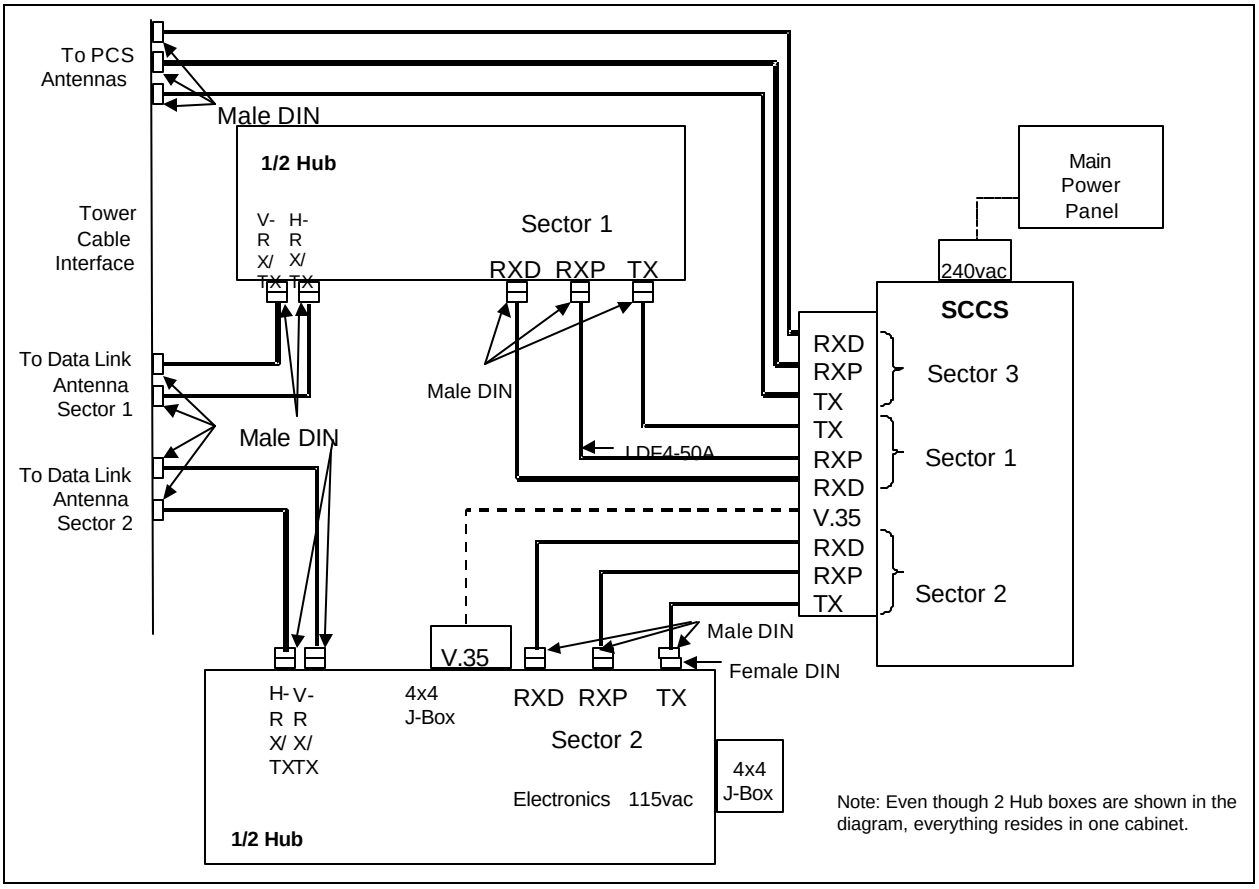


Figure 12. Interconnect Diagram for Hub Site

5.4 BIAS TEE ALARMING

The Lucent Base Station will alarm if no current draw is detected at the donor sector's Dx FRU. To disable this alarm, install a m-f 9-pin D shell plug, with a jumper on pins 3 and 4, at the Dx FRU J10 receptacle.

The Ericsson base station has current monitoring on each bias tee port. The bias tee port is used to power a single tower-top LNA. When a sector on the base station is split to run antennas on two sectors, each bias tee port drives two tower top LNAs as a result. The doubling of current demand causes an alarm to be reported. One solution to the problem is to combine two bias tee outputs to drive one bias tee. Figure 13 is a diagram of one of the options to solve the tower-top amplifier problem.

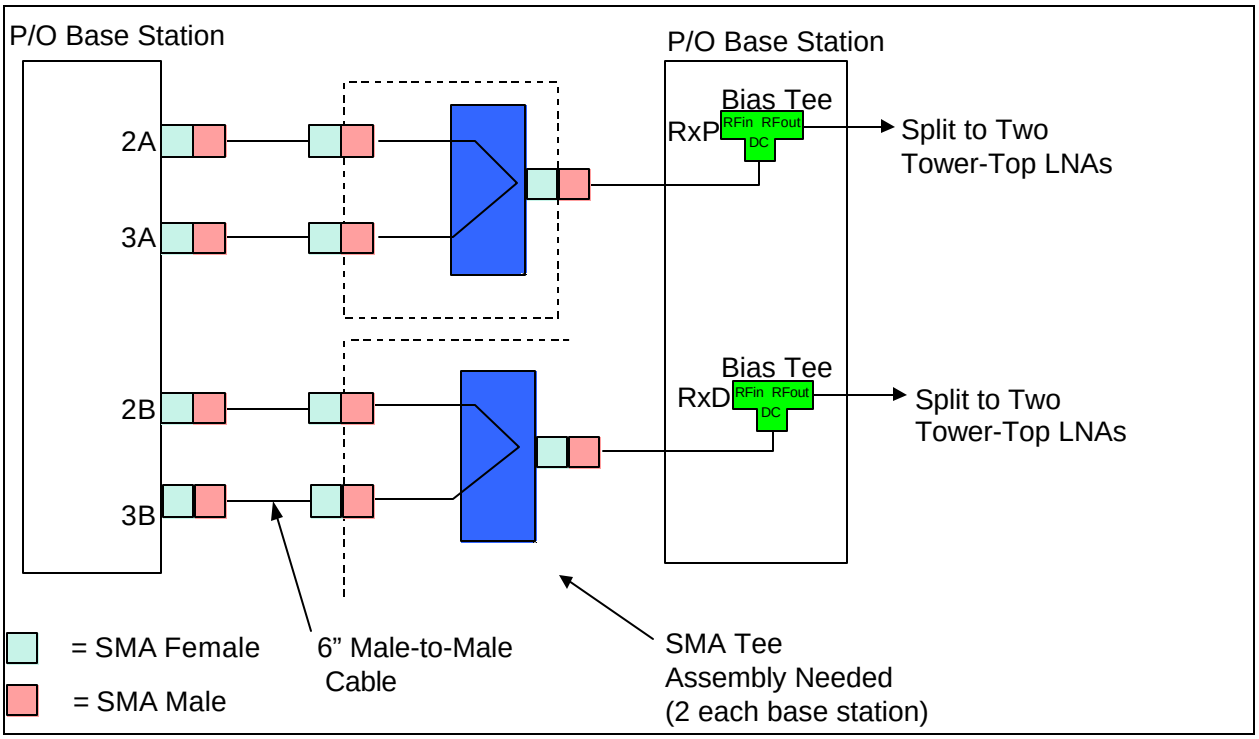


Figure 13. Solution for Tower Top Amplifier Alarming

5.5 HUB PRIME POWER FEED

Figure 14 is a diagram of the power distribution for a typical Hub Site. To maintain a single Emergency Generator Receptacle to power the SCCS and Hub, a main power panel is required. Contained within the panel will be a 20-amp, 120-VAC breaker for the Hub cabinet; a 100-amp breaker for the SCCS; a 100-amp or 200-amp main breaker; and a 100-amp generator breaker. If a 20-amp circuit is open in the SCCS or in the shelter's circuit panel, the power panel would not be required.

Along with the main power panel, a surge arrestor is required to protect the Hub's Assemblies and SCCS from voltage transients on the main power lines.

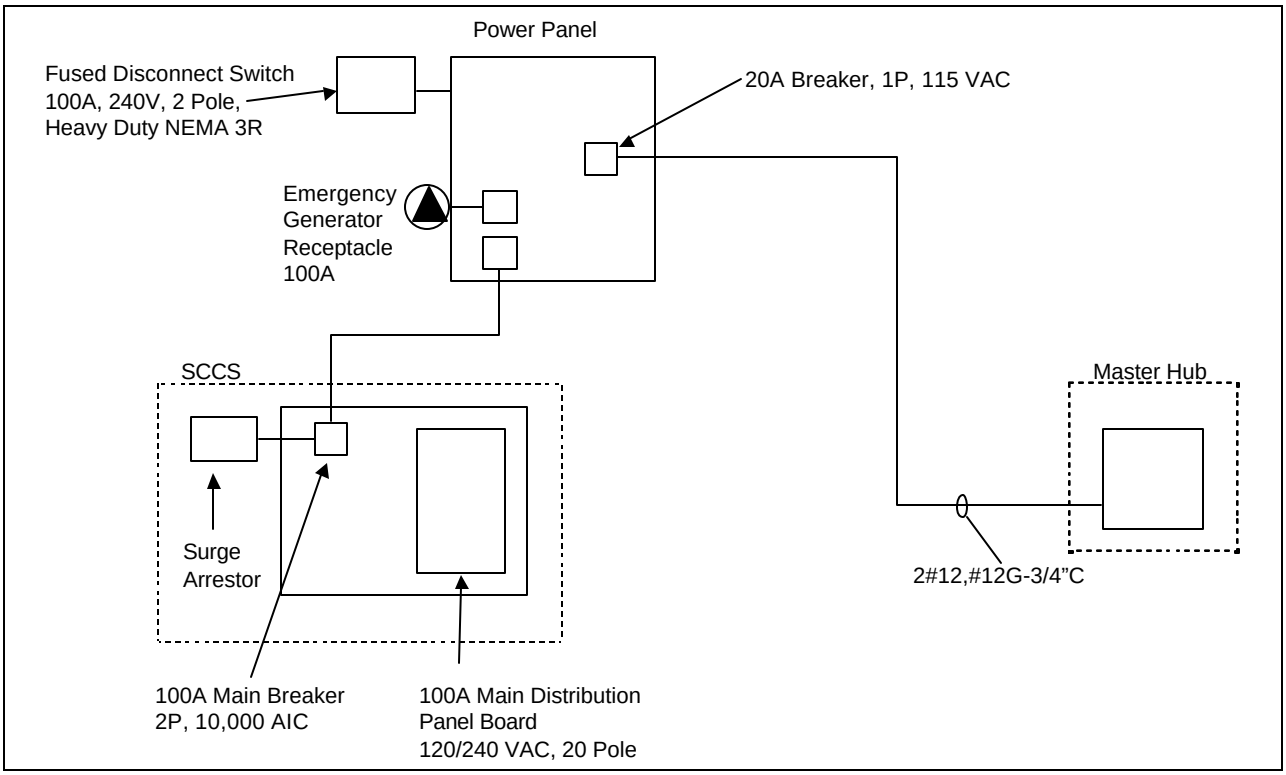


Figure 14. Prime Power Feed for Hub Site

5.6 HUB ASSEMBLY OUTLINE DIMENSIONS

Figure 15 is an outline drawing of the Hub Assembly. One side of the Hub Assembly has two 4-inch x 4-inch junction boxes labeled PWR and COM. The junction boxes allow the installer to make all necessary connections to the Hub without having to open the unit.

When the PWR junction box is opened for the first time, the installer will find flying leads for connection of electronics power and a grounding stud for safety ground. Each lead is labeled as to its connection point. Table 5-1 defines the label markings.

The COM junction box contains one 25-pin D connector for the V.35 connection. When the installer routes the communication cable through the conduit to the Hub, the cable will be terminated with the proper connectors by the installer.

The mounting base for the Hub enclosure is shown in Figure 16. The base is bolted to the concrete pad, and then the cabinet is placed on it. If the Hub enclosure is mounted inside a shelter, the base is not required. Figure 17 depicts the DIN connectors on the Hub cabinet.

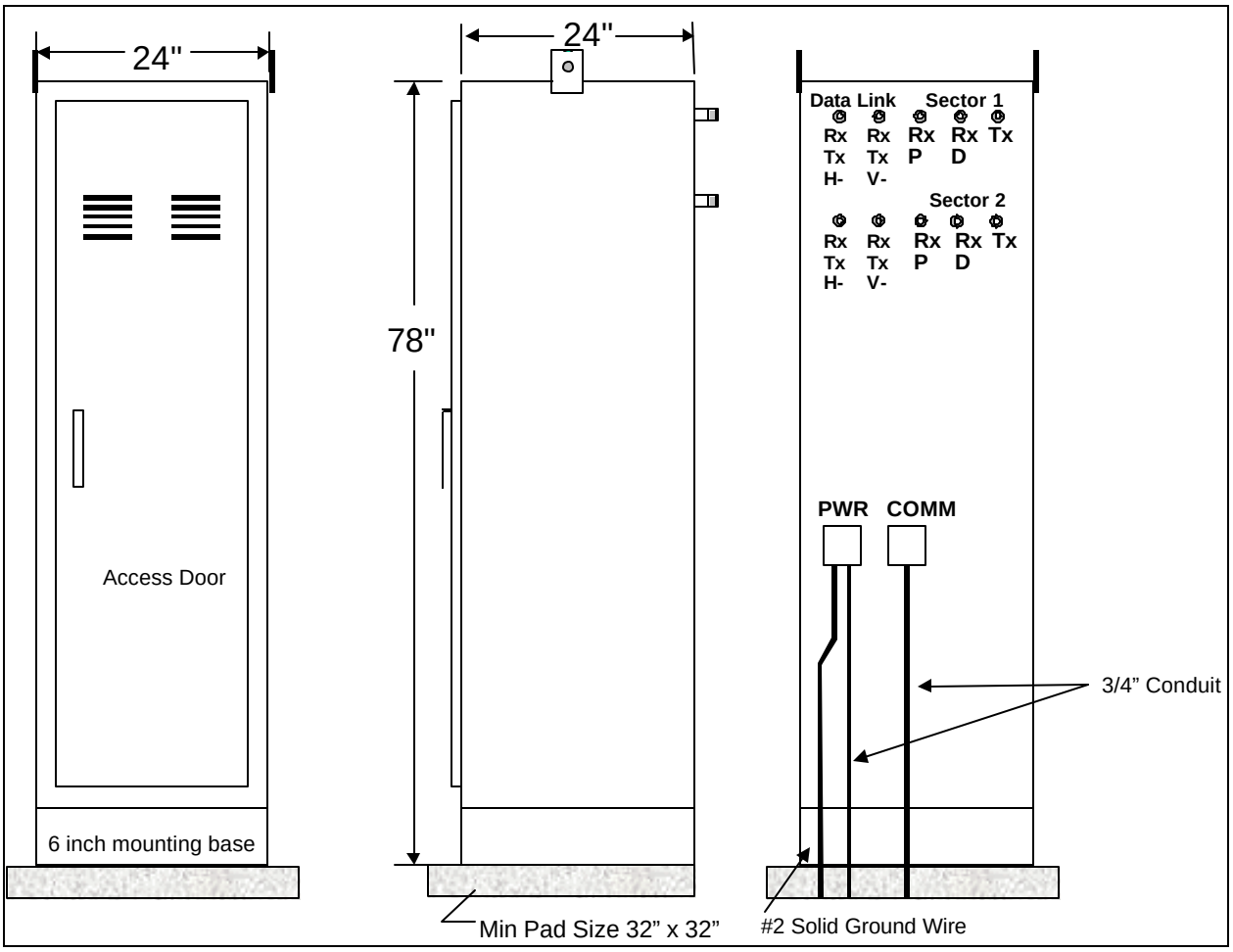


Figure 15. Outline Dimensions of Hub Assembly

Table 5-1. Input Power Labeling.

Device	Wire Marking
Electronics	ELEC
Return or neutral	NEUT
Safety Ground	Green Wire with Yellow Stripe

NOTE

A duplexer transmitter solution requires a hub duplexer tray as found in the G2 hub configuration. In the G2 configuration, connect BTS Tx/Rx primary cable to "Rx Primary Hub" antenna port, and the BTS Tx/Rx diversity cable to "Rx Diversity Hub" antenna port and weather-seal the unused Tx ports.

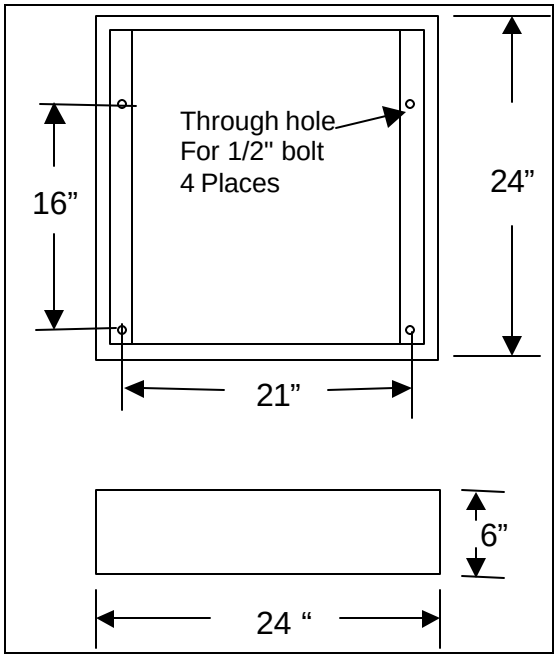


Figure 16. Hub Mounting Base

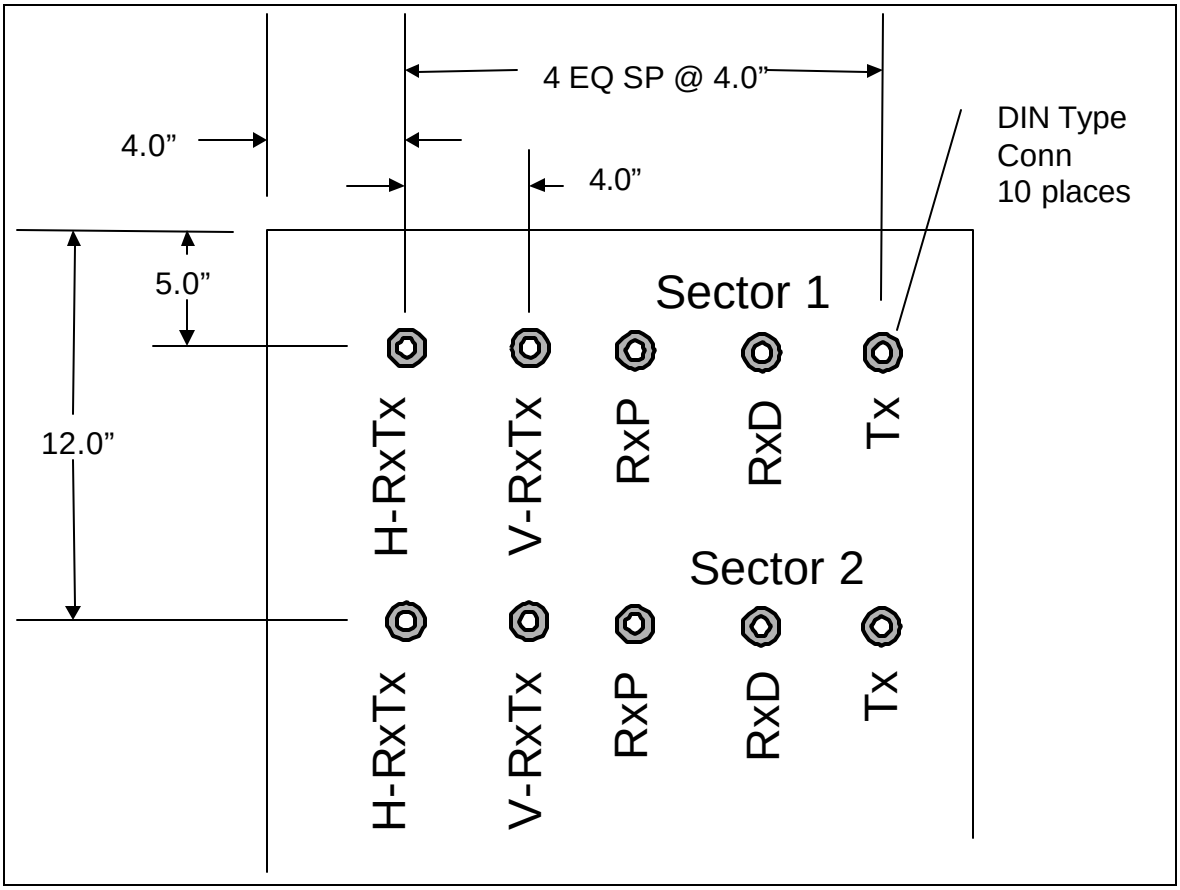


Figure 17. Connector Spacing

5.7 COMMUNICATION CONCEPT

Figure 18 depicts a concept for communication between a number of Hub sites and the existing network. The term *concept* indicates that this is one possible option for connecting the Operation, Administration and Maintenance (OA&M) interface to the network. The following are explanations for the major blocks:

1. Hub: Each Hub contains a V.35 interface and a Signal Processing Module (SPM) Ethernet (10BaseT) interface.

SCCS: Each SCCS contains a CSU as a minimum. The CSU must be updated to a CSU/DSU to provide the TransCell 1900TM access to a time slot (DS0) selectable by the customer. A DS0 line is needed for communications from a TransCell 1900TM site to be seen at the SEM. In order to peel a DS0 off of an existing fiber back-haul at the donor (Hub) site, a few CSU/DSU parameters must be modified to ensure smooth operation of the TransCell 1900TM. A typical setup checklist is shown below.

Table 5-2. Data Back-haul Configuration Checklist.

Parameter	Desired Value	Hub Site Check	Y/N	Switch Site Check	Y/N
Data Speed	64K	64K?		64K?	
DS0 Port Mapping	User configurable, must match both ends.	Same as switch?		Same as Hub?	
Clock	Hub: network Switch: internal	Network?		Internal?	
Port	Hub: V.35 Switch: Serial port	V.35 port activated?		Serial port activated?	
Protocol	Encapsulation PPP	N/A		Encapsulation PPP at Router Serial Port?	

2. MSC (Master Station Controller): All information from the Hub-Remote Pair (HRP) is transferred in ASCII format over the T1 lines to the MSC. The information for both the Hub and Remote Assembly in each HRP is sent from the Hub to the upgraded CSU/DSUs. The outputs of the CSU/DSUs are routed to the MSC for processing. At the MSC end, the CSU/DSU outputs are combined onto one T1 and fed into a router. The extracted OA&M data is then sent to an Ethernet Hub and routed to the OA&M interface (SEM). The SEM processes/displays operational information and provides a control point for the operation of all the HRPs. If a problem is detected, alarm information is sent automatically to the SEM, where it is made available to the Operational Support System (OSS) as tab-delimited ASCII data via TCP/IP.

NOTE

The customer must assign two IP addresses to each HRP.

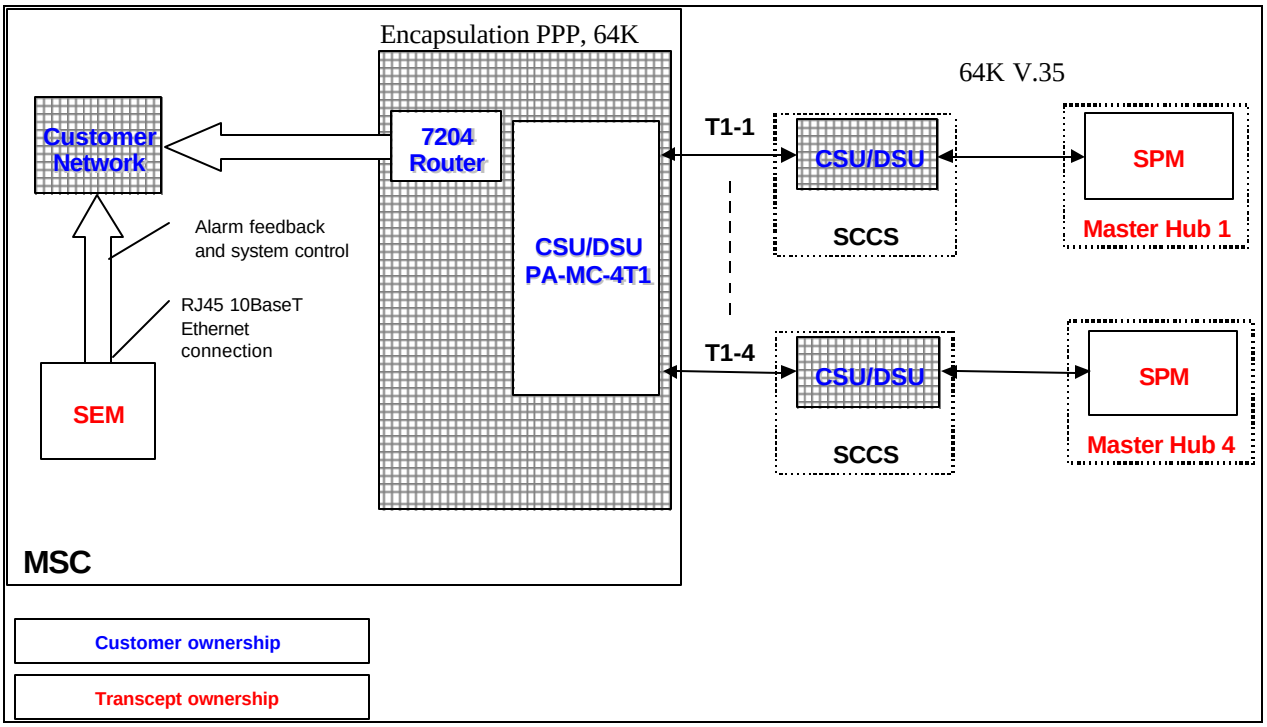


Figure 18. Communication Concept Block Diagram

5.8 V.35 CABLING SCHEME

Figure 19 is a diagram of the cables needed to route the V.35 signals from the CSU/DSU in the SCCS to the Hub. The customer shall supply the cabling that connects the CSU/DSU to the Transcept Enclosure V.35 cable interface (1000389).

After the cable is routed through the conduit into the Hub 4-inch x 4-inch junction box, a 25D connector (plug) will be attached. The Hub Enclosure v.35 interface cable shown below will be installed at Transcept prior to shipment. For a pin-out of this cable (1000389), see the TransCell 1900TM SEM / HUI User's Guide.

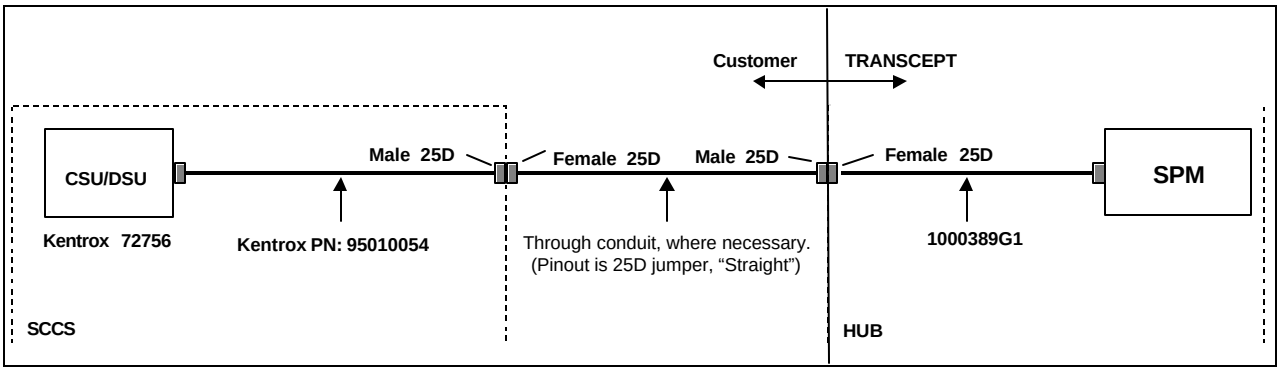


Figure 19. CSU/DSU to Router Cables

6.0 DATA LINK ANTENNA ALIGNMENT

Figures 20 and 21 are flow diagrams for the installation of the data link antennas (DLAs) by The customer.

6.1.1 Coarse Alignment

Figure 20 depicts the initial alignment procedure that can be performed by the tower climbers.

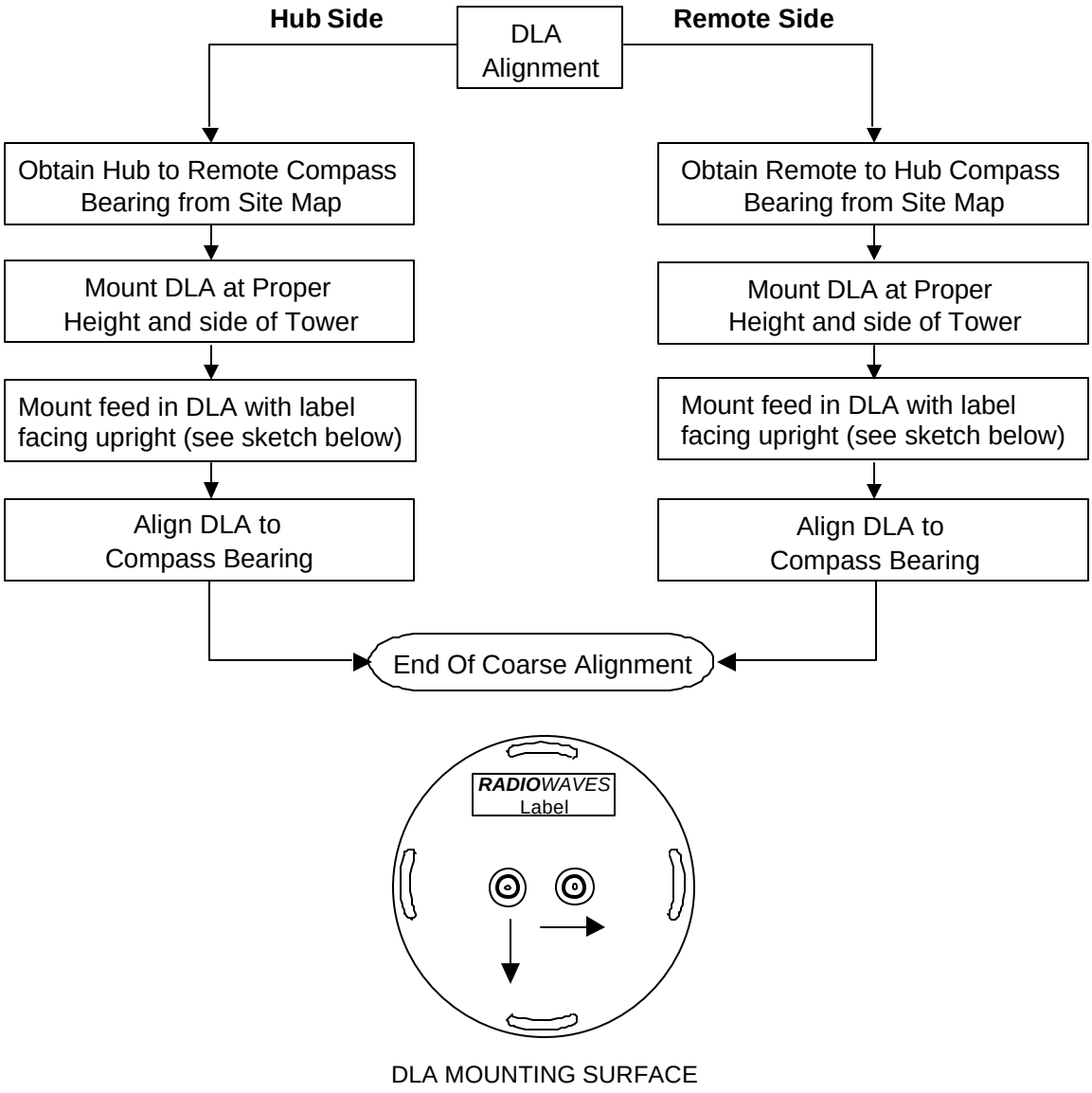


Figure 20. DLA Coarse Alignment

6.1.2 Final Alignment

Figure 21 depicts the final adjustment procedure. The final adjustments will require an RF transmitter and two RF receivers to aid in optimizing the path loss. A 5.8 GHz RF generator may be used as the RF transmitter and a spectrum analyzer or power meter may be used as the RF receiver.

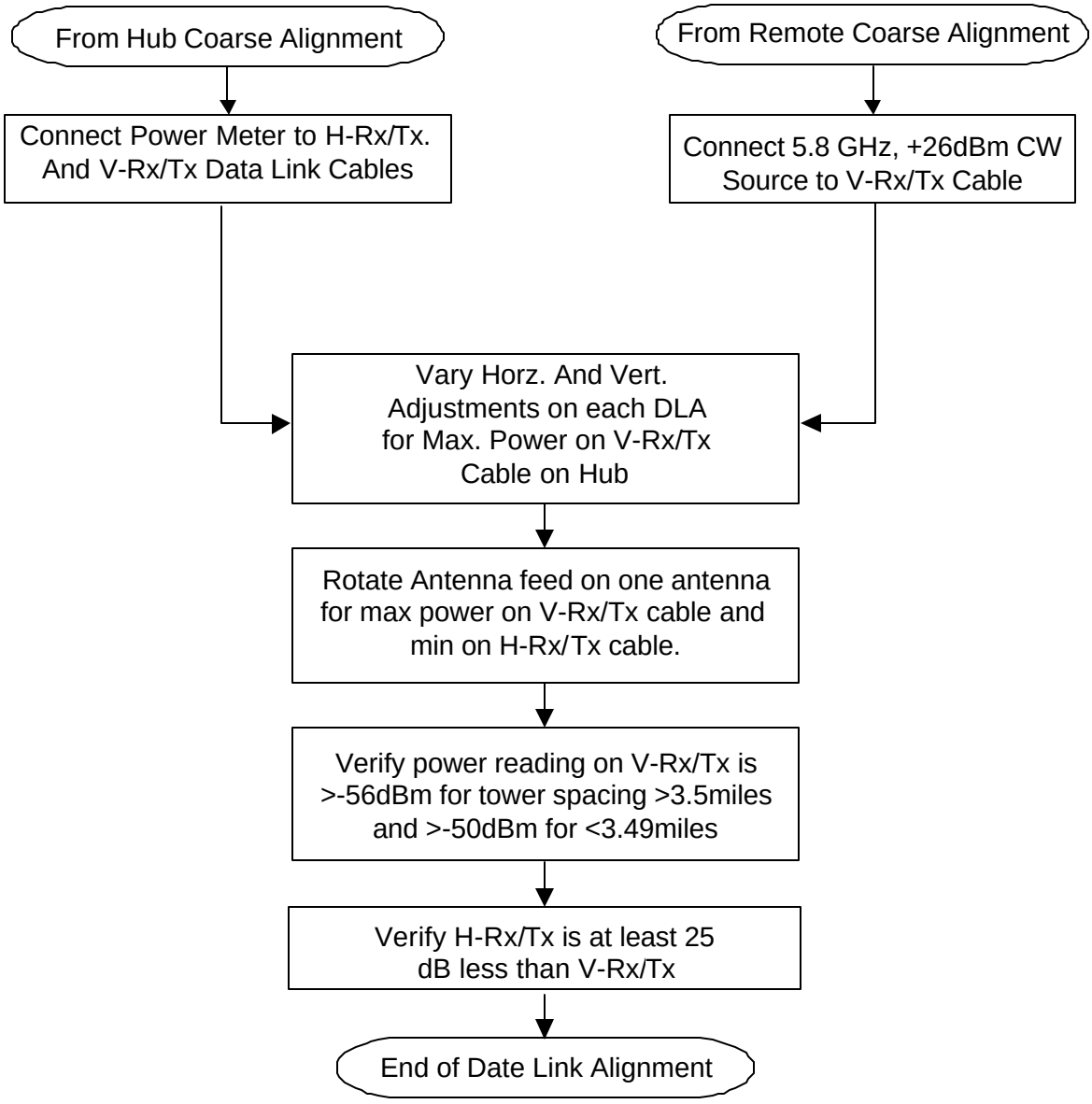


Figure 21. Final DLA Alignment

7.0 RF PLANNING

To better understand how to implement the TransCell 1900TM system with regard to RF planning requirements, the following paragraphs are included to give more detail than has been covered in previous documentation.

7.1 DATA LINK ANTENNAS

The standard antenna that is sold as part of the TransCell 1900TM system is a solid parabolic dish antenna. See Figure 22. See Appendix A for data-link antenna installation options.

Figure 22. Two Foot Parabolic Dish (example)

The antenna comes complete with a radome to cut down on wind loading and all the mounting hardware to attach the antenna to a pole with maximum diameter of four inches.

7.2 RF PLANNING MODEL

7.2.1 PCS Link Budget

The TransCell 1900TM system is simple to implement into a link budget. In the forward path, the repeater is transparent to the link budget. For the six-carrier system, when the BTS outputs 40 dBm into the Hub cabinet, the remote cabinet will output 40 dBm. In the reverse path, the repeater amplifies the signal by 10 dB (see Figure 23). If the input to the remote cabinet is -110 dBm, the power level output from the remote unit will be -100 dBm nominal. The TransCell 1900TM system can be thought of as a tower-top amplifier with no forward insertion loss.

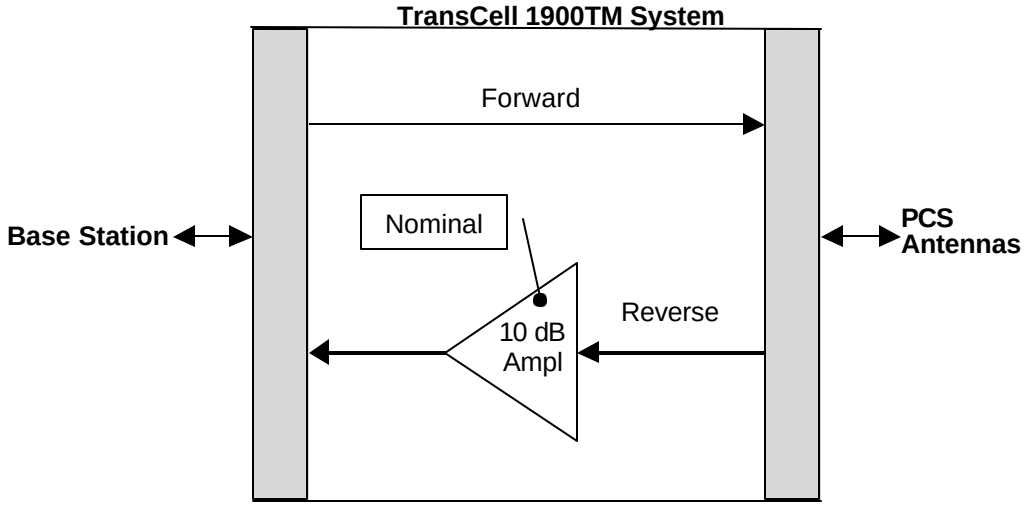


Figure 23. RF Model For TransCell 1900TM System

7.2.2 Data Link Budget

The TransCell 1900TM system is designed to work with tower spacing up to 12 miles. As long as the requirements of paragraph 4.3 are met, the data link will operate reliably. If a Lucent Base Station is used, however, a delay issue must be mitigated at data-link spans measuring over nine miles. See Paragraph 9.2.4 for details.

7.2.3 Alternate Installation schemes

This section depicts alternate ways to implement the TransCell 1900TM system into a network. The following paragraphs illustrate how flexible the TransCell 1900TM system is in solving coverage needs.

The term *sector* may be confusing when looking at the diagrams. The term sector is used in the following senses:

a. Each of the three faces of a tower is referred to as a sector. As there typically has been a one-to-one correspondence between the tower faces and the SCCS connections, the term sector has carried into the SCCS.

b. When looking at the repeater sites (where the remote cabinet is located), the term sector represents the side of the tower.

7.2.3.1 Standard Corridor Coverage

The term *standard coverage* refers to the original design concept of providing corridor coverage along a highway. Figure 24 is a top-down view of this implementation. The donor site is the middle tower and the two end towers are the repeater sites. Two of the sectors in the SCCS are microwave linked to the repeater sites and the third sector is run to the antennas on the tower. Figure 25 is a block diagram of the donor and repeater sites. At the donor site, the primary receive and transmit ports are duplexed together, split, connected to a tower-top LNA and run to antennas that are in separate sectors. The diversity receive port is split, connected to a tower-top LNA and run to antennas that are in separate sectors.

At the repeater site, there is a separate cable for each antenna. Prior to the antenna, a tower top amplifier is used to set the noise figure at the top of the tower. Duplexing and splitting are done internal to the remote cabinet. Each sector transmits the same PCS signals in sectors 1 and 2.

The power out of the remote cabinet is 10 watts per cable or antenna. Transmit power out of the SCCS is typically 10 watts. After splitting, the power is cut in half. The power loss must be included in the link budget.

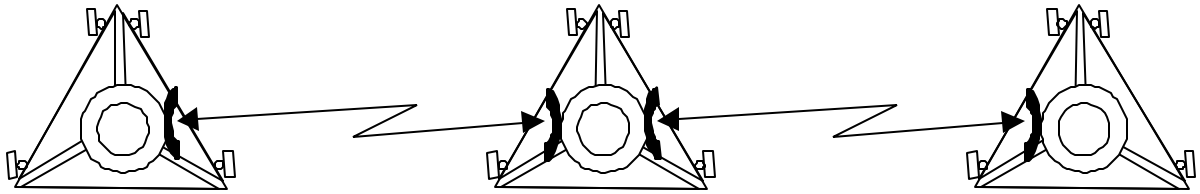


Figure 24. Top View of Standard Installation

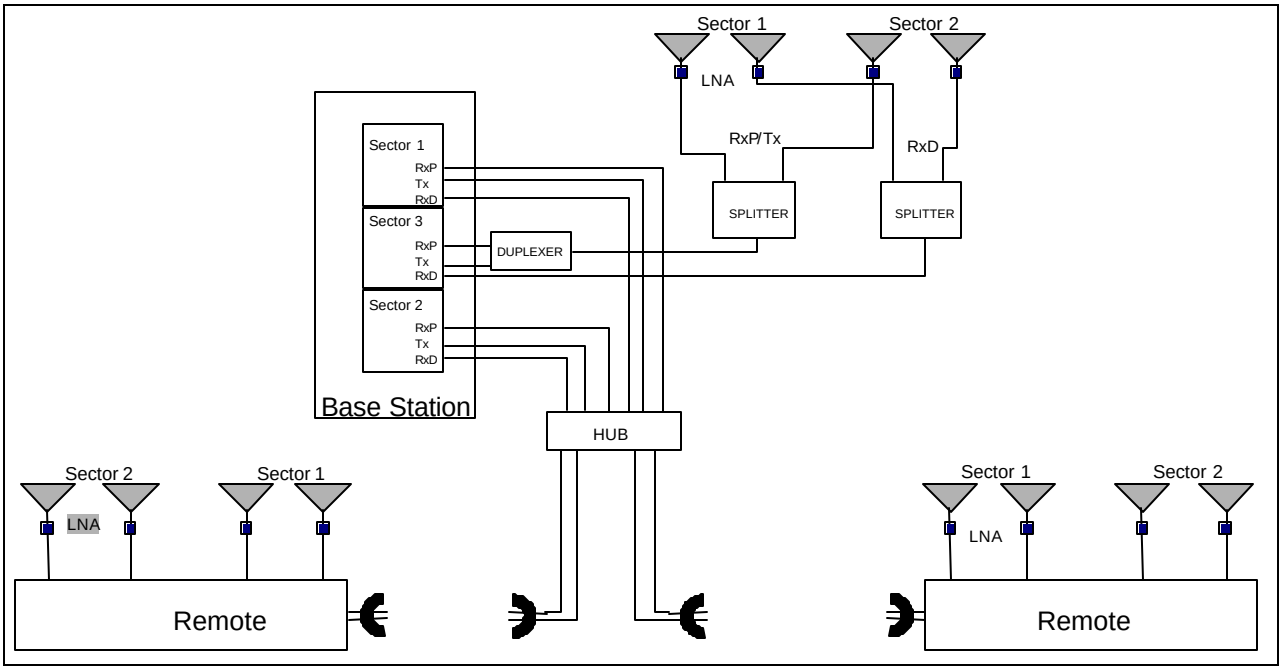


Figure 25. Block Diagram of Hub and Remote Installation

7.2.3.2 Single Repeater Installation

In some installations only one repeater will be used due to either ending a stretch of towers with a donor site or because a higher capacity base station is needed on the next tower. Figure 26 is a top-down view of a single repeater site. Figure 27 is a block diagram of the donor and repeater site. This setup assumes that corridor coverage is required. No splitters are required because the RF lines can be run directly to the PCS antennas.

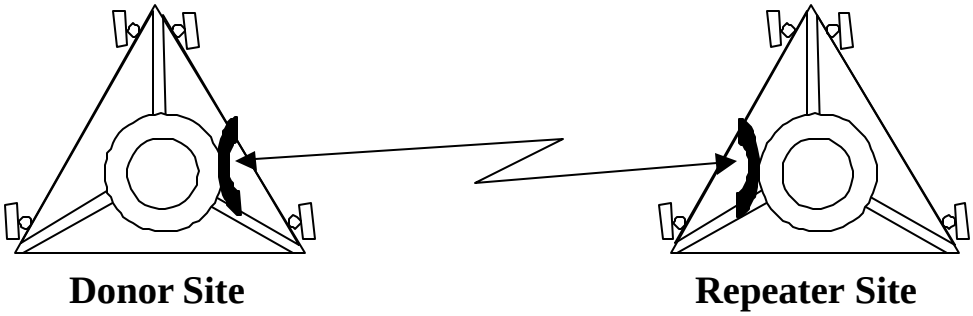


Figure 26. Top View of Single Repeater Installation

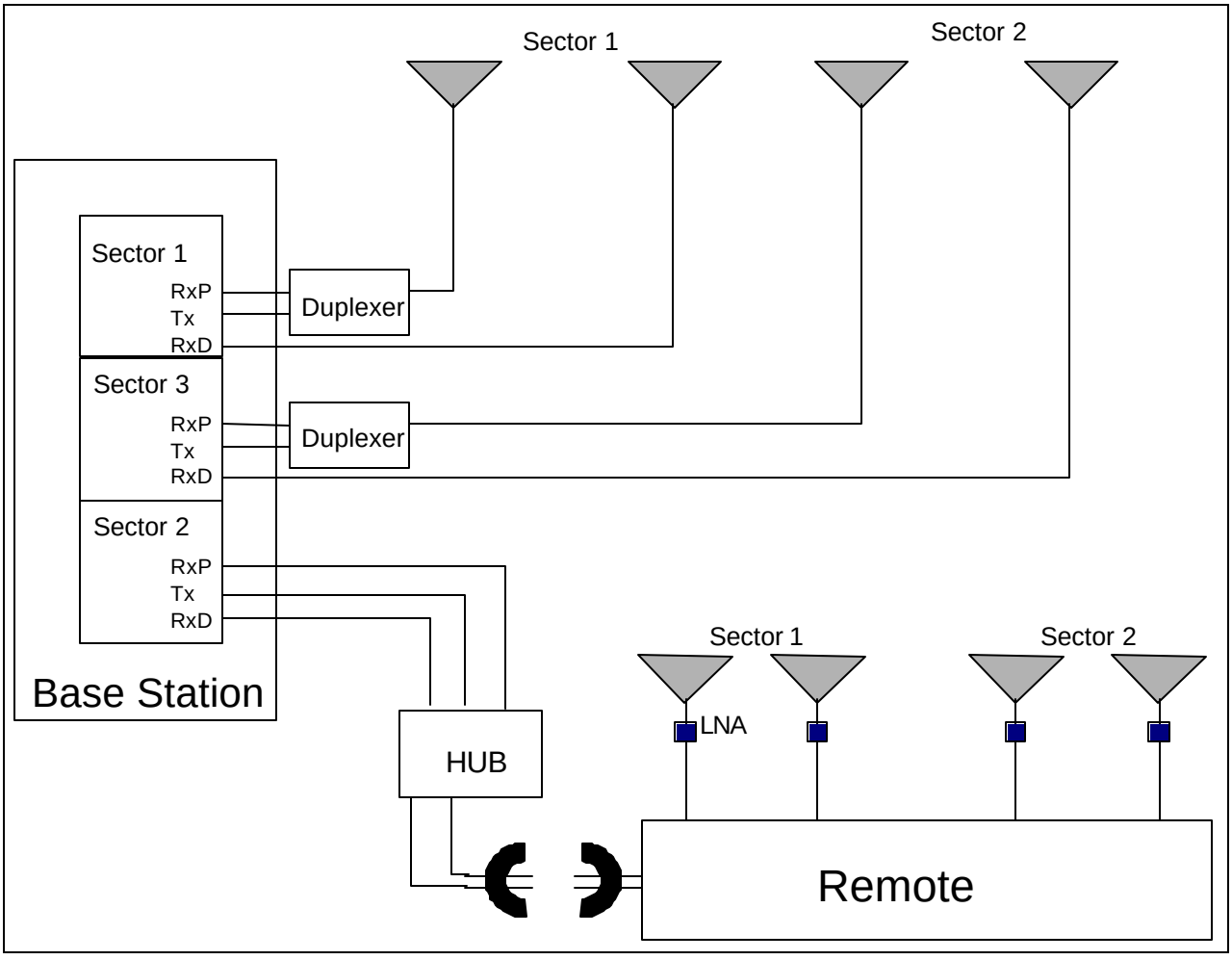


Figure 27. Block Diagram of Hub and Remote Installation

7.2.3.3 Three Sector Repeater

Figure 28 is a diagram of a three-sector repeater. Implementing this scheme mainly involves adding another sector's worth of antennas and LNAs. Even though three sectors are shown, the same channels are seen by all three sectors. There are not separate channels for each sector. Even with the added sector, the RF transmit power is still 10 watts per carrier.

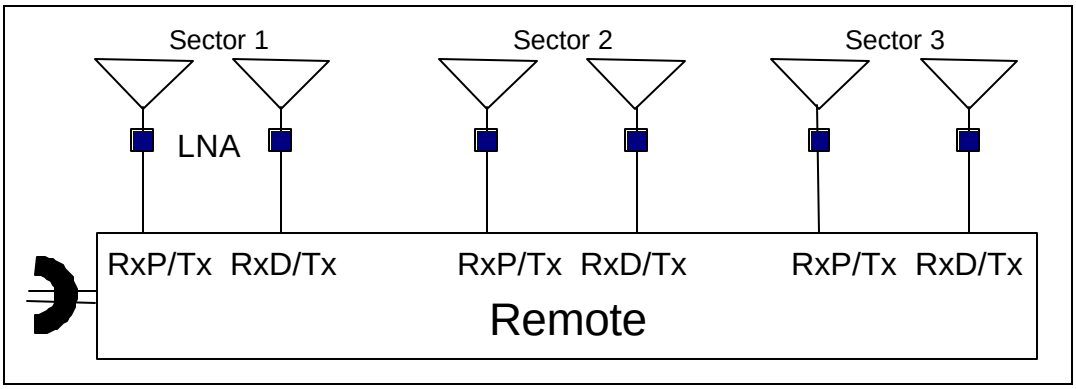


Figure 28. Block Diagram of Three Sector Remote

7.2.3.4 Three Sector Scheme at Donor Site

Figure 29 is a top-down view of the three-sector approach on the donor site. Even though only the donor site has three sectors, the repeater site could also have three sectors. Figure 30 is a block diagram depicting a three-sector donor site and two-sector repeater site. The approach in this scheme is to minimize the RF loss from splitting one sector into three sectors.

This approach splits one sector from the SCCS to two repeaters. Splitting the transmit power into the Hub reduces the transmit power by 3 dB. This is overcome by having the capability to adjust the output power of the repeater. A side note from this scheme is that two repeaters now share the channels from one SCCS sector. To maintain 6-carrier capability in both repeaters, the SCCS will need 12 radios.

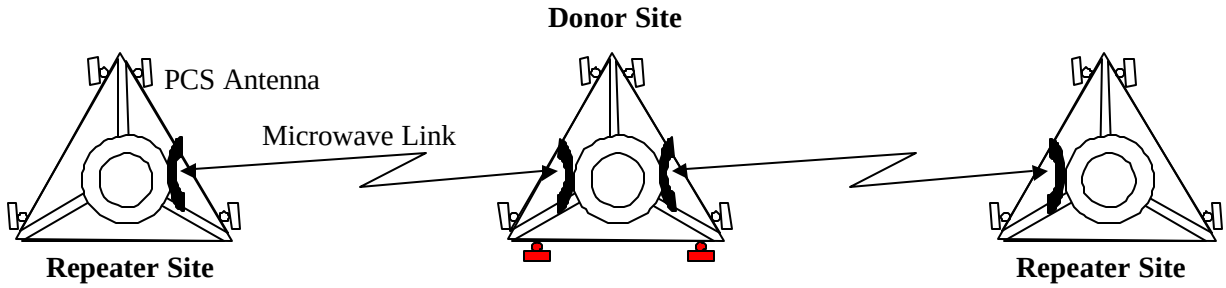


Figure 29. Top View of Three Sector Donor Site

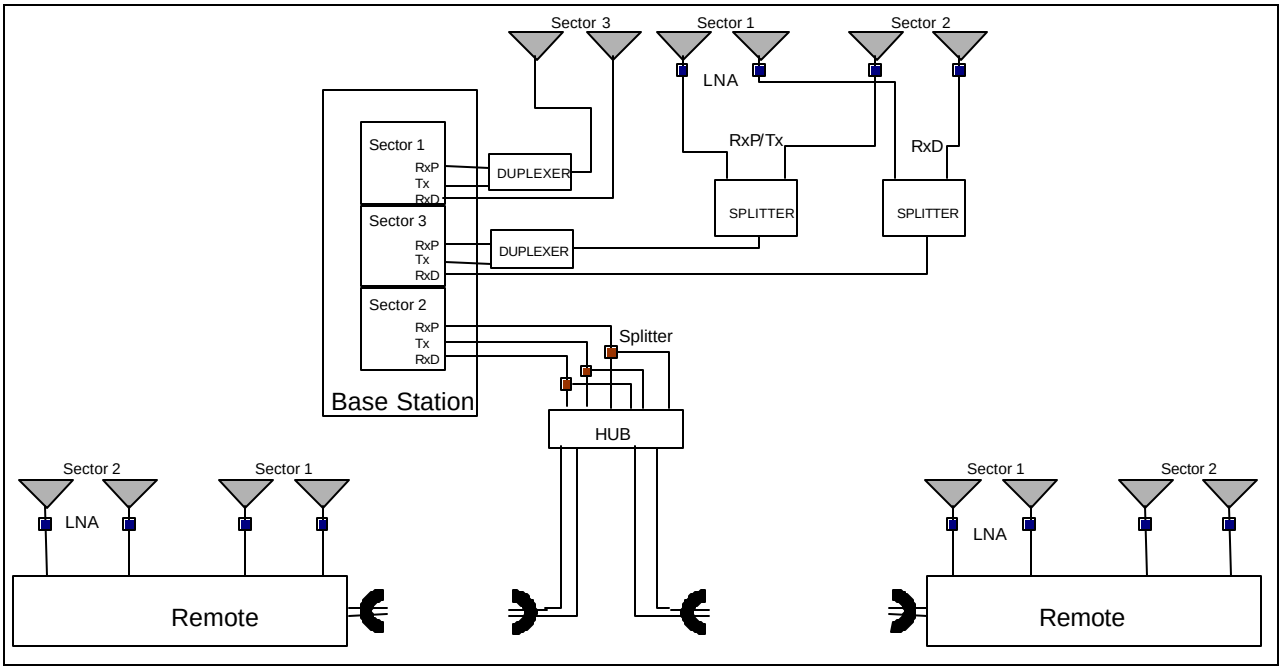


Figure 30. Block Diagram of Three Sector Donor Site

7.2.3.5 Large Radius Coverage

Figure 31 is a unique approach that gives three-sector type coverage without sacrificing any losses in transmit power. The idea is to locate an SCCS in the middle and to donate the three sectors to three repeaters. There are no PCS antennas at the donor site.

Figure 32 is a block diagram of the large radius coverage approach. This approach requires two Hub cabinets because each Hub cabinet can control a maximum of two remote cabinets. Three sectors are used on each repeater site to optimize coverage. The forward power out of each of the remote cabinets is 10 watts.

This approach allows for a very large radius of coverage from one SCCS. Figure 33 gives an idea of what type of coverage can be achieved. The gray area may have degraded coverage. The limiting factor in this approach would be the sensitivity of the phone. Assuming the sensitivity of the phone is 6 miles, the radius of coverage from the SCCS would be 12 miles. This approach would be best for rural areas due to the large radius of coverage, while the approach in paragraph 7.2.3.1 is best for highway coverage.

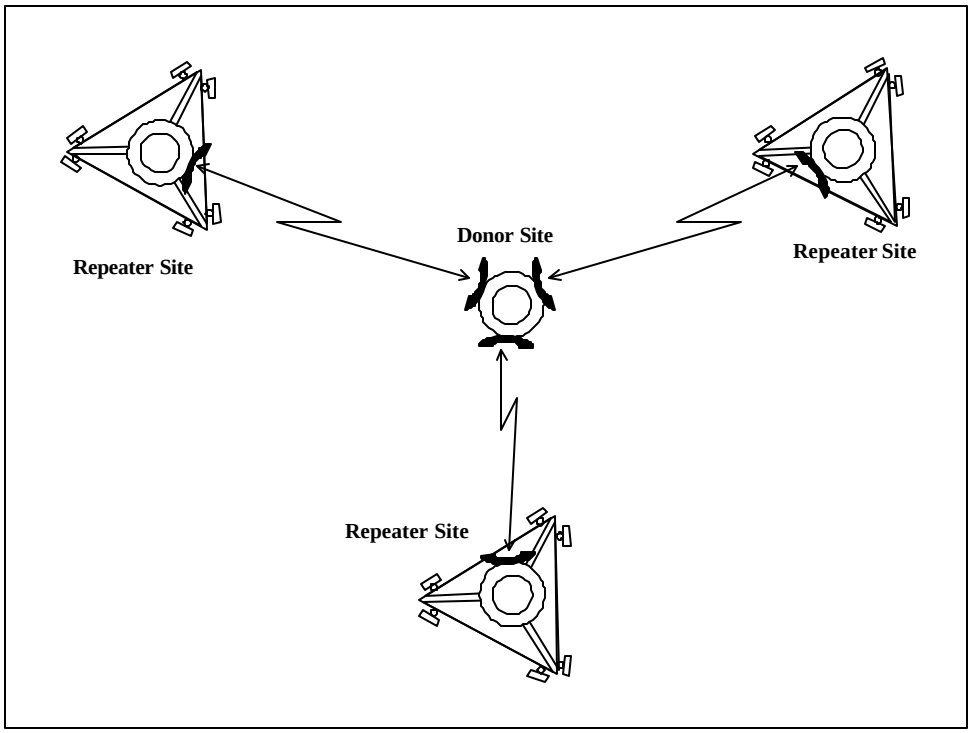


Figure 31. Top View of Large Radius Coverage Scheme

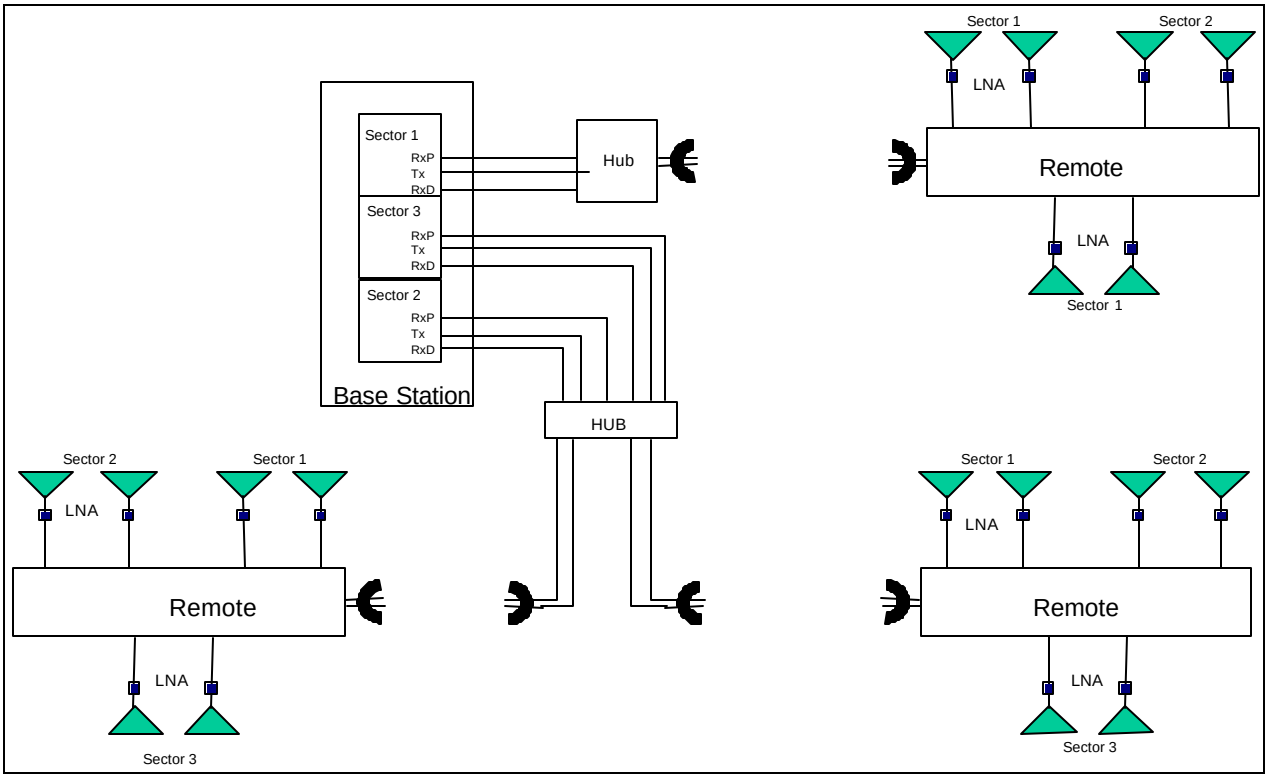


Figure 32. Block Diagram of Large Radius Coverage

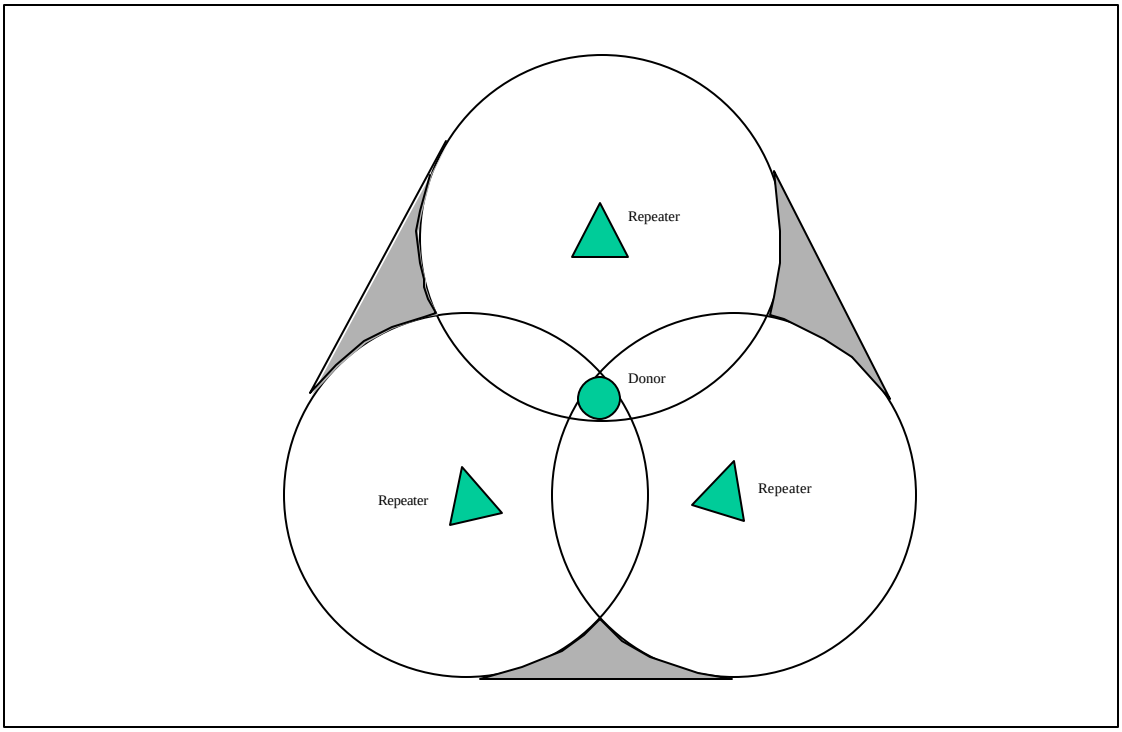


Figure 33. RF Coverage for Large Radius Coverage

8.0 HRP SYSTEM INTEGRATION

This section provides procedures and information used to configure and verify operation of the TransCell 1900TM Hub/Remote Pair (HRP) for use in a wireless network.

8.1 BASE STATION CONFIGURATION

8.1.1 BTS/SCCS Parameter Modifications

Proper operation of the TransCell 1900TM system within a conventional wireless network requires certain base station parameters to be adjusted. Table 8-1 depicts a parameter change list for Ericsson, Lucent, and Nortel base stations for use with TransCell 1900TM deployments.

Table 8-1. BTS/SCCS Parameter Modifications.

Manufacturer	Parameter	Required Change
Ericsson	MVERS (Mobile Verification)	Disable
	DC Bias on SCCS/RBS Rx Ports	Disable
	SSB Level	Increase 10 dB
	SSI (Power Increase) level	Increase 8 dB over BTS-only settings
	SSD (Power Decrease) level	Increase 8 dB over BTS-only settings

	Handoff Parameters / Thresholds	Increase by 8 dB
Lucent	Locate Radios	Disable
	Shortened Burst Mode	Enable
	Page 5 of FCI form, field 94	Change from 0 to 2.
	If Page 5 is full, go to page 6 of FCI form, field 118	Set to 2. (Max delay setting)
Nortel	DCCHDATA datafill FIELD 6	Change from normal to ABBREV
	TLR (TDMA Locate Receiver)	Disable
	HOPAIR datafill NBHO field	Change from enable to DISABLE for each sector pair, i.e. Z into X as well as X into Z.
	PWRCTRL datafill BSPC field	Disabled

8.1.2 Neighbor List Updates

During initial HRP installation, failed mobile hand-offs are historically due to a bad neighbor list. Because the TransCell 1900TM system has the ability to significantly change the RF footprint of its donor base station on a sector by sector basis, the neighbor list of the donor BTS and of each adjacent BTS (based on RF footprint) will require some tailoring. For example, in the scenario where a Remote Site is replacing a BTS/SCCS, the transplanted sector of the donor BTS/SCCS replaces the original BTS/SCCS entry in each adjacent BTS/SCCS neighbor list. Concurrently, the donor BTS/SCCS neighbor list would be updated to include these new adjacent BTS/SCCS sectors. Without this modification, mobile handoff functionality could be degraded or even rendered inoperable. For a quick cross-check of the Remote Site neighbors, note DCCH channel numbers seen by a mobile as it is moved out radially from the center of the site. This list should match a network planning list of DCCH channels and sectors for adjacent BTS/SCCS installations. During this test, if the call drops due to a low DCCH level in the presence of a large alternate DCCH level, the neighbor list needs to be updated.

8.2 HRP CONFIGURATION

To interface with an HRP, a laptop computer is needed with the following features:

- Windows NT
- HyperTerminal® or equivalent software
- 9-pin to RJ-45 adapter
- RJ-45 CATV cable
- RJ-45 CATV crossover cable
- Ethernet port
- Java Runtime Environment 2-001 or greater.
- HRP User Interface software.

8.2.1 TCPIP/Ethernet Network Layout

During system integration the Transcell 1900 TM system will be configured with various IP network parameters necessary for OA&M operation. The initialization and integration of the Transcell 1900 TM System requires the following information from the customer prior to installation:

- Hub and Remote Signal Processing Module (SPM) Network IPAddress assignments
- Hub and Remote Signal Processing Module (SPM) Router Configuration (Serial Interface IP of Router located at switch, one serial port per HRP)
- Hub and Remote Site Identification (NOCC/OSS Site Number)

The customer shall provide IP addresses for the configuration of the Transcell 1900 Signal Processing Module (SPM) which will reside on their network. Two SPMs exist in each HRP, with a maximum of 2 HRPs per SCCS site. The SPM will provide the Transcell OA&M system capabilities to the operator's NOCC or Switch via TCP/IP. For more information regarding the TransCell 1900TM network layout, see the Transcell 1900TM Sem/HUI User's Guide.

8.2.1.1 SPM TCP/IP Network Configuration

This procedure must be completed at both the Hub and Remote SPM to allow TCP/IP connectivity between each SPM in the TransCell 1900TM system and the operator's Wide Area Network (WAN).

a. Use a computer to interface to the SPM via Telnet or Console Terminal

b. Login to the SPM at the prompt.

c. Edit the *network* file located in the /etc directory:

Type ***pico /etc/network***

1) Change PPP_IP to corresponding IP provided by customer.
2) Change PPP_TTYS as follows:

Location:	Single HUB SPM	Dual HUB SPM CELL 1	Dual HUB SPM CELL 2	Remote SPM
PPP_TTYS:	Datalink	Datalink, cell2	datalink, cell1	datalink

3) During normal operation, there is no need to change ETH_IP or NETMASK. Recommended procedure for interfacing to Ethernet port at SPM is to change Laptop Computer IP to same subnet at SPM ETH_IP. (Ex: ETH_IP = 129.86.46.130, NETMASK 255.255.0.0, set Laptop IP to 129.86.46.140, netmask 255.255.0.0)
4) At the "CELL 1" HUB SPM, change V.35_IP to equal PPP_IP value. At the either the Remote SPM or the "CELL 2" HUB SPM, leave V.35_IP blank.
5) At the "CELL 1" HUB SPM, set V35_IP_REMOTE and DEFAULTGW to corresponding router serial IP located at MSC (switch). At REMOTE SPM, leave V35_IP_REMOTE blank and set DEFAULTGW to HUB PPP_IP value. At

the "CELL 2" HUB SPM, leave V35_IP_REMOTE blank and set DEFAULTGW to "CELL 1" HUB SPM's PPP_IP.

6) Set HOSTNAME following the hostname parameter guidelines as delineated in Table 1-2 of the TransCell 1900TM SEM / HUI User's Guide.

d. Press CTRL-X to exit the editor, type 'y' and then RETURN, upon exiting to save the updated information.

e. Edit the *hosts* file located in the /etc directory:

Type ***edit /etc/hosts***

1) Change the IP Addresses and hostname parameters to coincide with the network configuration. For detailed information pertaining to the synthesis of hostname parameters, see Table 1-2 in the TransCell 1900TM SEM / HUI User's Guide.

2) Change ROUTER to point back to the next IP in the communication chain "upstream".

- Example One: If you are at the Remote SPM, ROUTER should be set to the corresponding HUB SPM PPP_IP.
- Example Two: If you are at the Cell 2 HUB SPM, ROUTER should be set to the CELL 1 HUB PPP_IP.

f. Press CTRL-X to exit the editor, type 'y' and then RETURN upon exiting to save the updated information.

g. At the prompt, type 'tzselect' and follow the prompt to set up the time zone and local time of this SPM.

h. At the command prompt type 'sync' to write the updated buffers to flash memory. This will ensure the new information is saved to SPM Flash

i. Reboot the SPM by pressing the Reset button on the front panel or type the 'Reboot' command at the prompt. The changes will take effect upon re-initialization of the SPM.

8.2.2 DLM Configuration

The sections below discuss methods of adjusting DLM parameters to reliably achieve a desirable Bit Error Rate during normal operation of the Data Link.

8.2.2.1 DLM Channel Assignment

The necessity to modify DLM channels is determined by sweeping the 5.8GHz ISM spectrum for interferers, and selecting channels within the band to avoid any potential interference. Once this information is determined, the DLM can be configured and the data link can be brought on-line. The default DLM channels should be adequate for most installations. However, if it proves to be necessary, the DLM module may be tuned to several channels within the operating spread spectrum 5.8GHz ISM band using the following procedure.

a. Login to the local SPM using the HUI software.

b. Type GET HUBDLM FWCHAN at the Hub to ascertain current HUB DLM channel. Refer to Table 8-2 for the channels corresponding to the vacant target frequency.

c. If HUB DLM not already tuned to target frequency, type SET HUBDLM FWCHANNEL XB at Hub, where 'X' is the number of the desired channel according to Table 8-2. By convention, the HUB DLM Forward Channel is always the 'B' channel.

d. Repeat steps b and c for the HUB DLM reverse channel.

- Example: SET HUBDLM RVCHAN YA, where Y is the desired channel. By convention, the HUB DLM Reverse Channel is always the 'A' channel.

e. Repeat steps b and c for the Remote DLM forward channel.

- Example: SET REMDLM FWCHAN XA, where X is the same forward channel number as set at the HUB. By convention, the Remote DLM Forward Channel is always the 'A' channel.

f. Repeat steps b and c for the Remote DLM reverse channel.

- Example: SET REMDLM RVCHAN YB, where Y is the same reverse channel number as set at the HUB. By convention, the Remote DLM Reverse Channel is always the 'B' channel.

g. Verify DLM lock by typing GET HUBDLM LOCK. A report of '1' means the data-link is locked.

Table 8-2. DLM I/O Frequencies.

#	DLM Channel	Frequency (MHz)	DLM Path
1	1A	5736	Forward
2	1B	5736	Forward
3	2A	5758	Forward
4	2B	5758	Forward
5	3A	N/A	N/A
6	3B	N/A	N/A
7	4A	N/A	N/A
8	4B	N/A	N/A
9	5A	5817	Reverse
10	5B	5817	Reverse
11	6A	5839	Reverse
12	6B	5839	Reverse

8.2.2.2 DLM Output Power Adjustment

The output power required at the DLM TX/RX port is specified at 27.5 +/- 2.5 dBm. Use the following procedure to measure and set this output.

a. Using HRP User Interface, get the DLM Forward and Reverse channels for the DLM under test by typing GET HUBDLM FWCHAN at the HUB or GET REMDLM RVCHAN at the Remote. For information on how to use the HUI, see TransCell 1900TM SEM / HUI User's Guide.

b. Using an Agilent E4419B or equivalent power meter, calibrate a high power probe for the frequency under test (refer to Table 8-2).

c. Connect the power meter to the Enclosure DIN connector corresponding to the active DLM polarization.

d. Using the HRP User Interface (HUI), set the DLM "autosync" off by typing SET HUBDLM AUTOSYNC 0 at the Hub, or SET REMDLM AUTOSYNC 0 at the Remote unit.

e. If at the HUB, type SET HUBDLM FWSTATE 1. If at the Remote, type SET REMDLM RVSTATE 1.

f. Type GET HUBDLM FWATTEN at the Hub or GET REMDLM RVATTEN at the Remote to get current attenuation values. To set new values, replace "GET" with "SET" in the preceding commands and adding the new attenuator value at the end of the line.

   - Example: To set HUBDLM attenuator to 14.5 dBm, type SET HUBDLM FWATTEN 14.5 at the HUI command prompt.

g. Read power level at power meter. Adjust level until power level falls inside target window of 27.5 +/- 2.5 dBm by changing the DLM attenuator value via the HUI as outlined in step f.

h. Once both Hub and Remote DLM outputs are calibrated, set autosync state back to '1' on each DLM. Verify lock by typing GET HUBDLM LOCK. A report of '1' means the link is locked.

8.2.3 PCS HRP Configuration

The following procedures use the HRP User Interface (HUI) software to configure PCS parameters within the HRP. For information specific HUI commands and general HUI operation, see the TransCell 1900TM SEM / HUI User's Guide.

8.2.3.1 TDMA Channel Assignment

a. Make sure that the connection to the SPM via the Console Terminal is Initiated and Ping occurs.

b. Use a laptop computer to connect to the SPM via the Ethernet port on the front panel of the SPM.

c. Ensure the laptop computer is configured for the same network as the SPM address (customer IP Network).

d. Use the HUI software to set the HTM and RTM PCS band.

   - Example: To select PCS band 'B', type SET HTM BAND B and SET RTM BAND B.

e. Use the HUI software to configure the system TDMA HRP Channel assignments.

   - Ex: **set hrp tdmachan *n t***, where '*n*' is the HRP assigned carrier # 1 through 6 and '*t*' is the desired TDMA channel. The HUI will confirm each channel assignment is set. If the response it not confirmed, refer to the section on troubleshooting in the TransCell 1900TM Maintenance Manual.

f. If all six carriers are not used, insure that the unused carriers do not interfere by moving them at least 12 channels away from an occupied TDMA channel.

8.2.3.2 System Gain and Attenuation Settings

1. Make sure that the connection to the SPM via the Console Terminal is Initiated and Ping occurs.

2. Use a laptop computer to connect to the SPM via the Ethernet port on the front panel of the SPM.
3. Ensure the laptop computer is configured for the same network as the SPM address (customer IP Network).
4. Use the HUI software to verify the system forward and reverse gain and attenuation settings for each TDMA channel match the values shown in Table 8-3. The settings should be configured (using the '*set*' command) if there is any mismatch.

Table 8-3. Default HRP Gain Settings

HUB Settings:

HUI Command:	Standard Configuration Settings:
get hubspm fwgain [carrier # 1-6]	20
get hubspm prvatten [carrier #1-6]	3 to 5 (-43 dBm HTM output, given –51 dBm input at Remote Primary Receive Port)
get hubspm drvatten [carrier #1-6]	3 to 5 (-43 dBm HTM output, given –51 dBm input at Remote Diversity Receive Port)
get htm prvatten [carrier #1-6]	
get htm drvatten [carrier #1-6]	

Remote Settings:

HUI Command:	Standard Configuration Settings:
get remspm fwatten [carrier # 1-6]	5 to 15 (+48 dBm PA output power)
get remspm prvgain [carrier # 1-6]	16
get remspm drvgain [carrier # 1-6]	16
get rtm prvgain [carrier #1-6]	
get rtm drvgain [carrier #1-6]	

8.2.4 Reverse Path Filter Configuration

If the TransCell 1900TM system is being integrated with a Lucent Base Station, then an alternate set of reverse filters must to be loaded into the HRP to ensure normal operation. The extra 4 half-symbol delay introduced by Lucent base stations, when coupled with the TransCell 1900TM delay, can cause call origination problems when the Hub and Remote are separated by 9 miles or more. The alternate filters trade signal rejection for speed, and therefore degrade the TransCell 1900TM system's interference susceptibility as outlined in note 6 of the Product Specification. Use the following procedure to change the digital receive filters.

a. Determine the distance between HUB and Remote towers. If less than 9 miles, do not change the filters.

b. Login to the HRP via the HUI and verify data-link lock.

c. Type SET REMSPM RVFILTER ddcrmt63 and press ENTER.

d. Verify data-link re-locks within ten seconds.

8.2.5 OA&M Interface Configuration

In order to report alarming to the switch and System Element Manager (SEM) via TCP/IP, the Transcell 1900TM system requires access to the Base Station DSU/CSU installed at each Donor site and configured with an external V.35 data port interface to the Hub equipment. This access is typically provided through the operator's Wide Area Network (WAN). The general configuration is as follows:

- V.35 Data Port interface to Fractional T1
- Data Rate is 64 kbps
- Map data port to a single DS0 time slot (typically slot 24)
- DS0 time slot is routed to customer WAN at switch via DAX
- SEM set up as an element of operator's WAN.

The HRP IP addresses and hostnames must be entered in the SEM's database to allow alarm reporting. For this data entry procedure and other SEM setup procedures, see the TransCell 1900TM SEM / HUI User's Guide. For information pertaining to regular maintenance and troubleshooting procedures, see the TransCell 1900TM Maintenance Manual.

8.3 OPERATIONAL TEST AND VERIFICATION

These procedures are provided in this specific order to enable a smooth and successful TransCell 1900TM integration into the wireless network. Checklists are provided to further streamline the verification process and document useful information about the installation itself for later reference. See Appendix B. See the TansCell 1900TM Maintenance Manual for information about the test points mentioned in this section. Once the HRP and support systems are verified by filling in the checklist, the installation process is complete.

8.3.1 Tower Mounted Amplifier / RF Cable Testing

It is recommended that the Tower Mounted Amplifiers (TMA), used in-line with the PCS receive antennas, are checked for proper installation prior to connecting the Remote Enclosure. While the TransCell 1900TM TTAM will indicate a cable short or no-current condition on power-up (see TransCell 1900TM Maintenance Manual), it is more efficient to check the RF cables for shorts, opens, and RF loss prior to connecting them to the Remote Enclosure. The existence of shorts, opens, or losses greater than 4 dB at PCS frequencies indicates a need for cable replacement.

8.3.2 Data Link Margin Measurement

The test outlined in Table 8-3 verifies the data link margin of the Transcell 1900 TM system. The data link margin will be measured and compared to the value determined in the link budget calculation, which is based on tower spacing, tower height, data link frequency, and antenna gain. The data link margin should range anywhere from 25 dB to a minimum acceptable tolerance of 12 dB. If a unit fails this test, follow the troubleshooting procedures outlined in Table 4-3 of the TransCell 1900TM Maintenance Manual for a HUB_DLM_REVERSE_INPUT_WARNING.

Table 8-4. Data Link Margin Test.

Test Configuration:

HUB

- Connect a laptop computer to the Ethernet port of the SPM module and run the HUI software. Ensure the data link is locked, and measure the DLM BER in normal operation. Ideally should be close to 0.00 e ^-11.
  BER Test Commands:
  get hubdlm lock (DLM lock status; 1 = locked, 0=unlocked)
  reset hubdlm bercount (sets the BER accumulator to zero)
  get hubdlm beraccum (Reports BER and # of samples)
- Disable the DLM Autosync mode and shut off the DLM Transmitter:
  set hubdlm autosync 0 (Autosync = 1, Enabled)
  set hubdlm fwstate 0 (FWState = 1, Enabled)
- Disconnect the RF ANT cable from the DLM module that connects to the back of the Hub enclosure. Install either a variable attenuator or vary the attenuation by incrementally adding SMA pads. Start with 10 dB of attenuation.
- Re-Enable the DLM Autosync mode:
  set hubdlm autosync 1
- Wait for the data link to lock back up, reset the 'bercount', and verify the DLM BER is < 10.00 e^-5 with a sample count greater than 40. Continue to add attenuation and measure DLM BER until it exceeds the threshold > 10.00 e^-5.
- The data link margin is the amount of attenuation added to the point the DLM BER threshold of 10.00 e^-5 was exceeded. Note this value on sheet provided in Appendix B.

Data Point	Normal Indication	Abnormal Indication
DLM BER > 10.00 e^-5	Margin > 12 dB	Margin < 12 dB

8.3.3 HRP Forward/Reverse Path Balancing

The following procedures are used to verify the HRP Forward and Reverse RF paths are fully functional in preparation for HRP/network tie-in. During normal operation, the automated functions "Forward Autolevel" and "Reverse Auto-Gain" will negate gradual gain fluctuation throughout the HRP. Table 8-4 covers Forward path testing, and Table 8-5 covers Reverse path testing. Sample test data sheets can be found in Appendix B and should be used for data collection to document system data.

Table 8-5. Forward RF Path Balancing and Test.

Test Configuration:

HUB

- Inject a test signal (Channel *f1 – f6*) at Hub HTM Tx Input Port @ -20 dBm

Remote

- Connect test cable and equipment to the 46 +/- dB test port of the High Power Combiner located at the back left of the PA Tray. **Note: Channels 1&2 will be measured on PA Tray #1 and channels 3-6 will be measured on PA Tray #2**.
- Using the HUI, Enable the PA for the carrier being tested.
  Set pa state *n* 1, where ***n*** is the carrier being tested
  (PA State 1=Enabled, 0=Disabled)
- Set PA output power to +48 dBm by setting the remote SPM forward attenuation accordingly. If this value cannot be reached:
  - Verify CW input power and frequency.
  - Verify HRP TDMA Channel assignments.
  - Verify digital power in the channel is at a level of 3 +/- 2 by typing **GET REMSPM FWPOWER *n***, where *n* is the carrier under test.
  - Verify RF cable integrity between the RTM and PA.
- Measure the forward Power (using CW input signal) and forward EVM (using NADC TDMA signal modulation as input) at the relevant test port. Record values in data-sheet provided in Appendix B.
- Disable the PA when the measurement is complete.
  Set pa state *n* 0, where ***n*** is the channel being tested
  (PA State 1=Enabled, 0=Disabled)

Data Points (6)	Normal Indication	Abnormal Indication
Channel(*f1 – f6*)	+2 dBm +/- 2 dB; EVM < 10.25%	< 0 dBm and/or EVM > 10.25%

Table 8-6. Reverse RF Path Balancing and Test

Test Configuration:

Remote

- Connect a CW signal source with test cable to the Rx_P/Rx_D Sector 1 RF connector located on the Remote Interface tray front panel. The four remaining Rx_P/Rx_D sector connectors should be terminated into 50 ohms.
- Adjust the CW signal source output power so that –43 dBm is seen at the corresponding Remote Interface Tray RF port.

HUB

- Connect measurement equipment (HP 8935 or equivalent) to the HTM Primary/Diversity Rx Port. Be sure to use the more sensitive RF input port of the test equipment when making low power RF measurements.
- Measure the reverse output power (using CW input signal) and reverse EVM (using NADC TDMA signal modulation as input).
- If the output power is less than –41 dBm, check the following:
    - Verify CW input power and frequency.
    - Verify HRP TDMA channel assignments.
    - Verify digital power level of +6 dBm by typing **GET REMSPM PRVPOWER *n*** for Primary RX or **GET REMSPM DRVPOWER *n*** for Diversity RX, where *n* is the carrier under test.
    - Verify RF cable integrity between Remote Interface Tray and RTM.
- Repeat test for Sectors 2 and 3 (where available).

Data Points (36)	Normal Indication	Abnormal Indication
Channel(*f1 – f6*), sector 1 (Primary Rx)	-39 dBm +/- 2 dB; EVM < 10.25%	< -41 dBm and/or EVM > 10.25%
Channel(*f1 – f6*), sector 2 (Primary Rx)	-39 dBm +/- 2 dB; EVM < 10.25%	< -41 dBm and/or EVM > 10.25%
Channel(*f1 – f6*), sector 3 (Primary Rx)	-39 dBm +/- 2 dB; EVM < 10.25%	< -41 dBm and/or EVM > 10.25%
Channel(*f1 – f6*), sector 1 (Diversity Rx)	-39 dBm +/- 2 dB; EVM < 10.25%	< -41 dBm and/or EVM > 10.25%
Channel(*f1 – f6*), sector 2 (Diversity Rx)	-39 dBm +/- 2 dB; EVM < 10.25%	< -41 dBm and/or EVM > 10.25%
Channel(*f1 – f6*), sector 3 (Diversity Rx)	-39 dBm +/- 2 dB; EVM < 10.25%	< -41 dBm and/or EVM > 10.25%

8.3.4 HRP Transmitter Cable Test

This procedure pinpoints RF cables, internal to the HRP, which may have been damaged during transport to the site.

a. Ensure Remote is correctly terminated (either into antennas or high power loads).

b. Using the HUI, disable PAs.

c. Telnet into the Remote and enable test tones in the forward direction by typing the following at the prompt:

- /opt/hwdebug/w16 f808000e cc
- /opt/hwdebug/w16 f8080012 1fff

d. Check that REMSPM FWPOWER <N> is 2.93 for each carrier.

e. Check REMSPM PRVPOWER <N> and DRVPOWER <N>.

f. Turn on PAs.

g. Adjust REMSPM FWATTEN <N> to get -1 into PAs.

h. Check REMSPM PRVPOWER <N> and DRVPOWER <N> again, it should not have risen by more than 1dB, If it has there is a cable/antenna problem with the Remote.

i. To find out which cable set is the problem:

1) Check for a short at each BNC input labeled “BIAS” on the Remote Interface Tray. Note the label’s sector and primary / diversity designator.
2) Disable PAs.
3) Verify there is no short in the corresponding antenna cable. If there is, pursue antenna cable replacement.
4) If the Antenna and Cable test out fine, replace HRP RF cable connecting the Remote Interface Tray to Enclosure Antenna port designated in step 1.

j. Disable test tones:

- /opt/hwdebug/w16 f808000e 0
- /opt/hwdebug/w16 f8080012 0

8.3.5 HRP Tie-In and Network Verification.

After completion of all configuration, balancing, and testing of the Transcell 1900 TM system, a final checklist of completed requirements should be documented by the field technician. A copy of this checklist is available in Appendix B. This checklist should be signed off by the field technician prior to releasing the system for network coverage. The following procedure is recommended to complete the HRP integration.

a. Connect the base station to the HRP. At this point, the BTS/SCCS should have all the parameters set as shown in Table 8-1.

b. Energize the Hub and Remote Enclosures.

c. Assign the DCCH channel in the HRP by typing **SET HRP DCCH *n***, where *n* is the carrier (1-6) which transports the TDMA DCCH frequency.

d. Unlock the base station and verify calls can be made at the donor site on the non-donated sector.

e. Open up the HUB enclosure and verify call origination on the donated sectors via RF leakage. Mobile must be inside the cabinet for this to work.

f. Enable HRP PAs.

g. Verify DCCH PA output power level at 48 +/- 1 dBm via HUI software.

h. Verify Call origination at the Remote Site on each active carrier by placing multiple calls.

i. Verify neighbor lists by placing a call and driving towards a neighboring tower to achieve hand-off.

j. Enter the HRP ID information at the SEM per the procedure in the TransCell 1900TM SEM / HUI User's Guide. Verify the HUB_COMMS_ALARM is closed within 2 minutes.

k. For future reference, it is recommended that the following files are transferred and archived at the SEM or other centralized network location at the time of installation.

- /etc/network
- /etc/hosts
- /var/log/exec.messages
- /var/log/startup
- /var/log/messages
- /var/lib/6cmr/database

NOTE

As these filenames are the same for each SPM, it is suggested that a directory be created for each HRP, containing sub-directories for its HUB and REMOTE SPM.

Appendix A:
Data Link Antenna Installation Options

A-1 ANTENNA SELECTION AND SPACING

The information given in the main body of this document pertains to a 2-foot parabolic dish with tower separation of 6 and 12 miles. To give more flexibility and solutions to various installation issues, Figure A-1 depicts datalink coverage given antenna size and tower position.

The cable used for all the calculations is Andrew type LDF4.5. This is the largest diameter cable that can be used at 5.8 GHz.

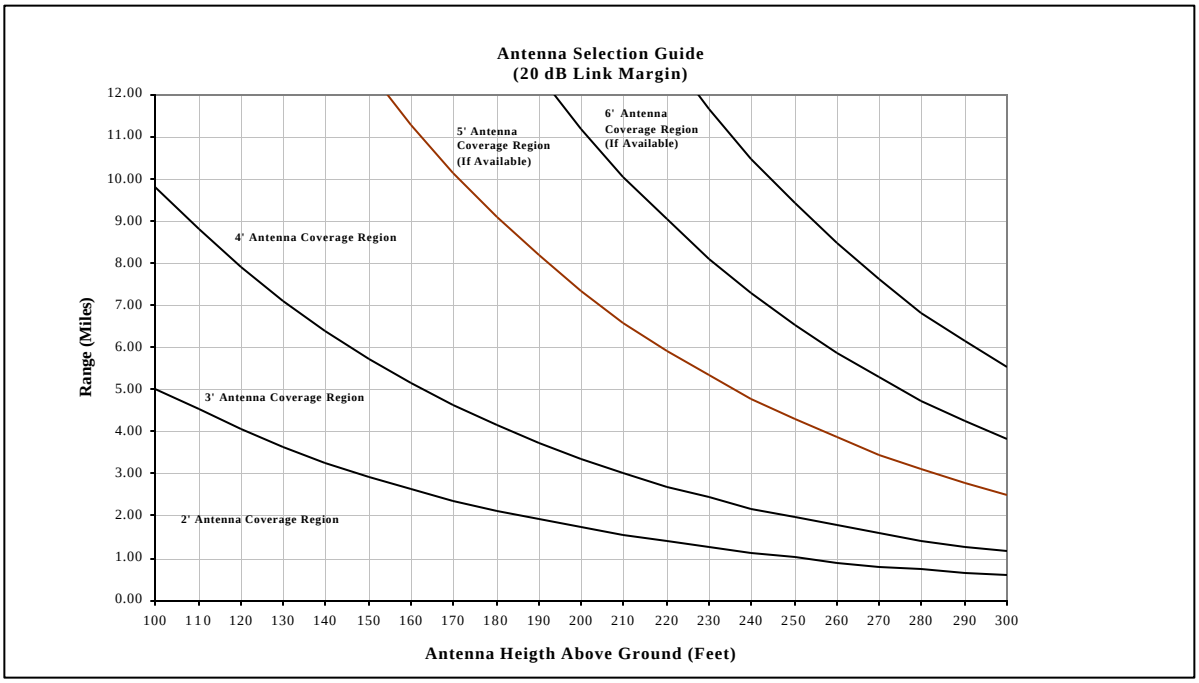


Figure A-1 Datalink Coverage (20dB margin)

A-2 DATA LINK INTERFERENCE

In some service areas, issues may arise with regards to other non-licensed users in the area interfering with the data link. Depending on the interference source and what access you have to the other source; interference problems can be solved in the following ways:

- If you have a working relationship with the other user of the spread spectrum unlicensed band, you can work with that user to adjust which channel you both transmit and receive on.
- If you do not have a working relationship with the other user of the spread spectrum unlicensed band, the interference problem can be solved by:
  1) Adjusting the data link channels away from the other user.
  2) Using the opposite antenna polarization.

3) Increasing the size of the parabolic dish used. This gives a tighter beam width that is less susceptible to interference.

Appendix B:
Sample Installation Data Sheets

Forward RF Test Measurements

Site Name: _____ **Date:** _____

System Configuration:

HUB *SPM SN:* _____ **Remote** *SPM SN:* _____

HTM SN: _____ *RTM SN:* _____

DLM SN: _____ *DLM SN:* _____

Tx Primary Sector 1-3		TDMA Ch.	EVM 1 Peak	EVM 1 Avg.	EVM 10	Signal Level (dBm)
	1					
	2					
Tx Diversity Sector 1-3						
	3					
	4					
	5					
	6					

Reverse RF Test Measurements

Site Name: _____ **Date:** _____

System Configuration:

HUB *SPM SN:* _____ **Remote** *SPM SN:* _____

HTM SN: _____ *RTM SN:* _____

DLM SN: _____ *DLM SN:* _____

Rx Primary Sector 1		TDMA Ch.	EVM 1 Peak	EVM 1 Avg.	EVM 10	Signal Level (dBm)
	1					
	2					
	3					
	4					
	5					
	6					
Rx Primary Sector 2						
	1					
	2					
	3					
	4					
	5					
	6					
Rx Primary Sector 3						
	1					
	2					
	3					
	4					
	5					
	6					
Rx Diversity Sector 1						
	1					
	2					
	3					
	4					
	5					
	6					
Rx Diversity Sector 2						
	1					
	2					
	3					
	4					
	5					
	6					
Rx Diversity Sector 3						
	1					
	2					
	3					
	4					
	5					
	6					

Site Name: _____ _____

Enclosure SN: _____ _____

System Configuration:

	HUB	Remote
SPM1 SN:		
SPM2 SN:		
HTM1 SN:		
HTM2 SN:		
DLM1 SN:		
DLM2 SN:		
LVPS1 SN:		
LVPS2 SN:		
TTA SN:		

TDMA Channel Assignments:

Carrier 1		
Carrier 2		
Carrier 3		
Carrier 4		
Carrier 5		
Carrier 6		

System Settings:

		Ch. 1	Ch. 2	Ch. 3	Ch. 4	Ch. 5	Ch. 6
HUBSPM	FWGain						
	PRVAtten						
	DRVAtten						
REMSPM	FWAtten						
	PRVGain						
	DRVGain						

IP Network Configuration:

HUB	SPM1	SPM2
IPAddress		
Subnet Mask		
Default GW		
Hostname		

REM	SPM1	SPM2
IPAddress		
Subnet Mask		
Default GW		
Hostname		

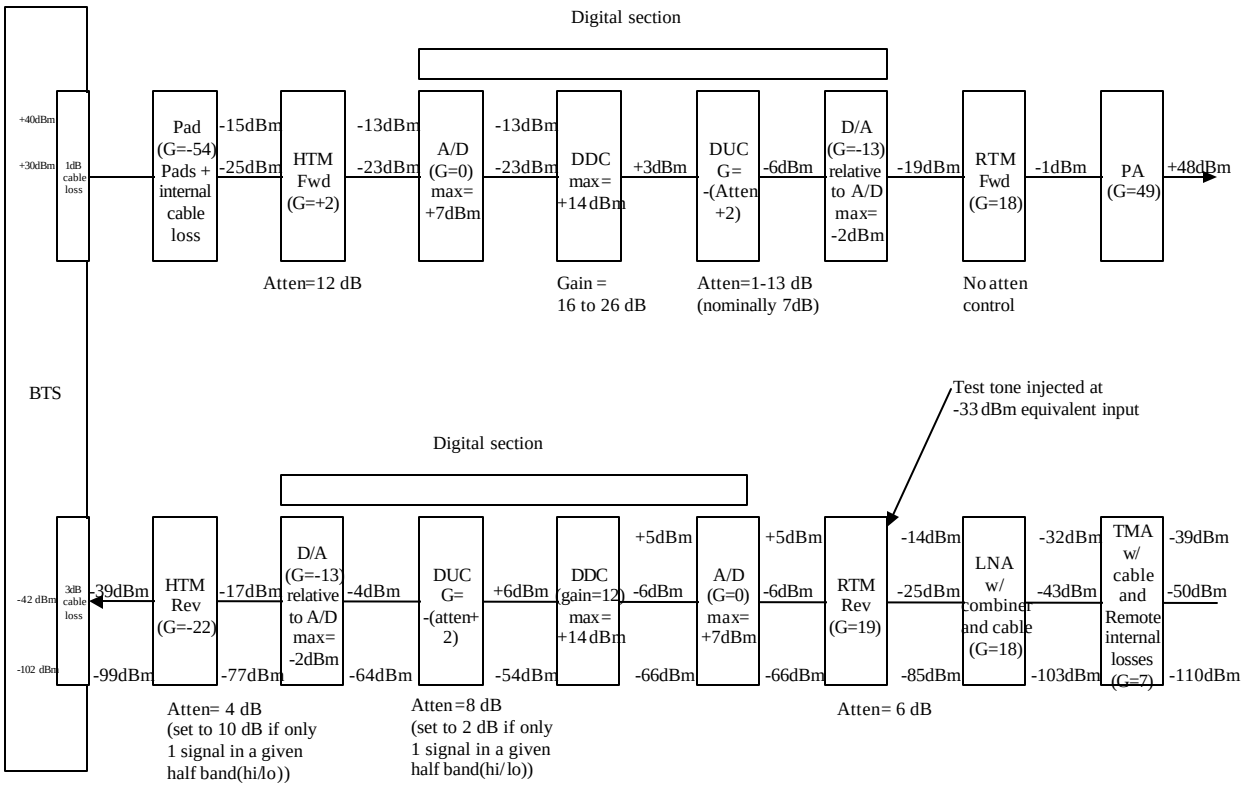
Data Link:

Alignment:		
Input Power		dBm
Vertical Rx Power		dBm
Horizontal Rx Power		dBm
Path Loss		dB
Link Margin		dB

Configuration:	
Frequency 5.8 Ghz	
Hub Tx Channel	
Hub Rx Channel	
Rem Tx Channel	
Rem Rx Channel	
Hub Forward Atten	
Rem Forward Atten	

Appendix C:
HRP Power Level Limits

TransCell 1900TM Power Plan



TransCell 1900TM
SEM/HUI
User's Guide

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02/22/01	A	Released to ECO control per RN010221	km/CL

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LIST OF TABLES

1. INTRODUCTION

This manual is the User's Guide for the SEM and HUI Subsystems of the TransCell 1900TM System. The manual is organized into the following sections:

Section 1 – General TransCell 1900TM networking information.

Section 2 – Users guide for SEM.

Section 3 – Users guide for HUI.

Section 4 – Installation procedure for the SEM/HUI software.

Section 5 – Operating procedure for the SEM software.

Section 6 – Operating procedure for the HUI software.

Section 7 – Command Line Interface definition

1.1 NOTATION CONVENTIONS

This manual assumes that the user has a basic knowledge of the Windows NT® operating system. Several typographic conventions and standard Windows NT® terms are used in this manual when discussing the HRP user interface software. They are as follows:

Mouse Commands - The HRP user interface software uses only the left mouse button:

"click" - press and release the left mouse button

"double-click" - press and release left mouse button twice in quick succession

Menu Commands - Menu commands are bolded with each command level separated from the previous one by a slash (/) mark, e.g., "Select **Privileges/Modify Privileges**."

Button Names – Command button names in dialogs are underlined, e.g., "To exit from dialog, click Close."

Key Names - Key names are spelled out and appear in small, bold capital letters, e.g. **ENTER, ESCAPE, CONTROL**.

Dialogs and Messages - Dialog and message titles are generally referenced exactly as they are shown on the title bar. However, version numbers appearing in the title bar are usually not referenced, so a dialog title that actually reads "SEM (Version 1.2)" is referred to as the SEM dialog.

Dialog Options - Labels for dialog options (text boxes, radio buttons, and drop-down lists) are shown in italics, e.g., "Select desired *IP Address*." All instructions to "select" or "choose" an option imply clicking on that option (options can be selected via the keyboard as well).

Keyboard Input - Instructions for keyboard entries start with "Type: ...", and anything that should be typed in verbatim is shown in a contrasting font. For example, "Type: *set hub fwdatten 2* 12.5 in the *HRP Command:* text box."

Displayed Text - Text displayed in a dialog box is shown in another contrasting font, e.g., "The HRP Response dialog displays the message CONFIRM: SET HUB FWDATTEN 2 12.5.

1.2 ACRONYMS AND ABBREVIATIONS

GUI	Graphical User Interface
HRP	Hub Remote Pair
HUI	HRP User Interface
SPM	Signal Processing Module
SEM	System Element Manager
6CMR	6 Carrier Microwave Repeater (TransCell 1900TM)
CLI	Command Line Interface
HTM	Hub Transceiver Module
RTM	Remote Transceiver Module
DLM	Datalink Module
LVPS	Low Voltage Power Supply
OSS	Operation Support System

1.3 REFERENCE DOCUMENTATION

- TransCell 1900TM System Operation and Maintenance Manual, Transcept Document No. 1000497

1.4 SYSTEM OVERVIEW

1.4.1 Network Requirements

Figure 1-1 shows a typical configuration for the TransCell 1900TM System.

The System Element Manager (SEM) and Host User Interface (HUI) communicate with a Hub/Remote Pair (HRP) over the customer's WAN. The HRPs are connected to a customer provided CSU/DSU via a V.35 serial connection. The CSU/DSU communicates over a DS0 slot in a T1 line to another CSU/DSU at the customer's switch. The CSU/DSU at the switch is connected to a router over another V.35 serial connection.

A IP network connection can now be established between the Transcept V.35 Master SPM in the HRP and the Customer's Router at the switch. Once this connection has been established, the SEM can connect to the HRP to monitor its health. Likewise a HUI located on the customer's network can connect to the HRP to view or change system settings. The Router must be programmed to pass traffic for the HRP IPs out of its V.35 serial port that is connected to the CSU/DSU.

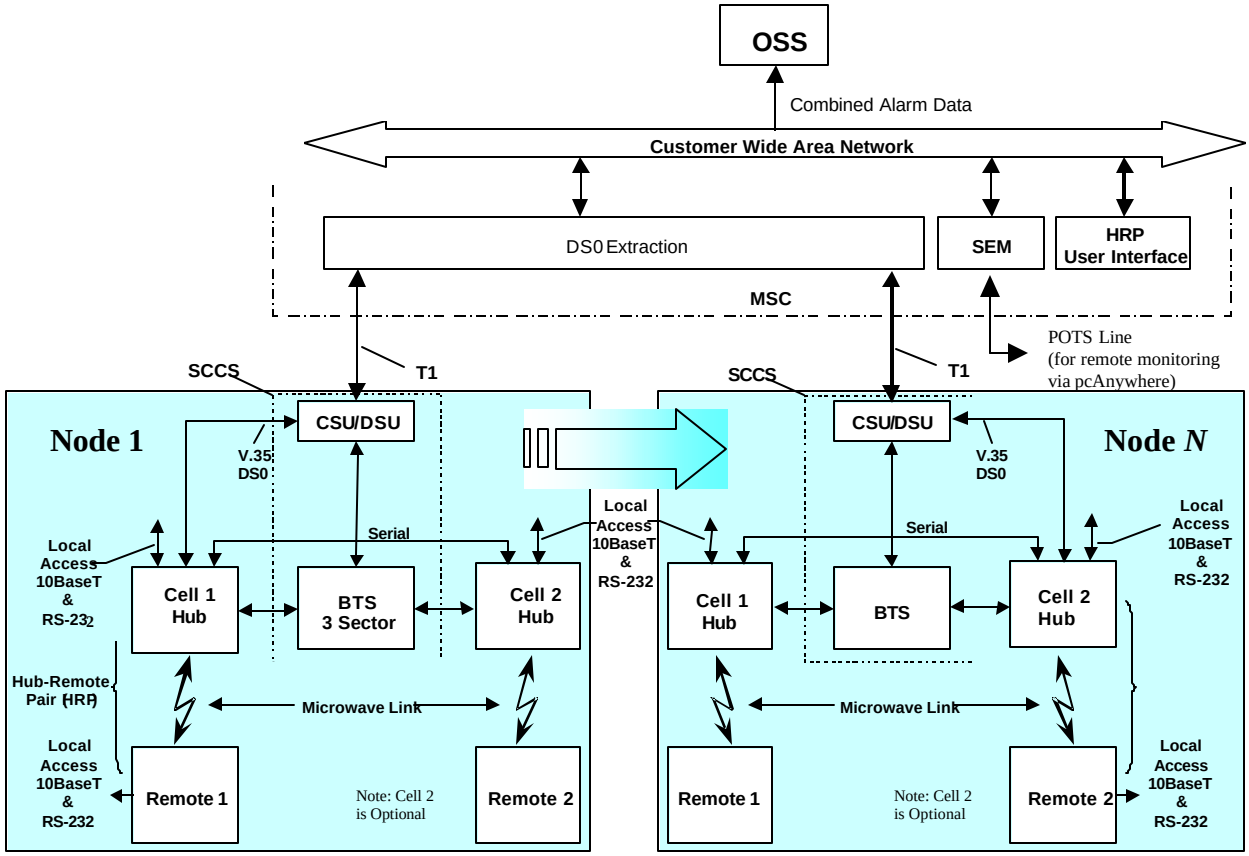

Figure 1-1. Typical TransCell 1900TM System Configuration in a Wireless Network

To operate a Transcept SEM and HUI over a network, the customer must provide the following items:

- IP address for SEM (one per switch)
- Ethernet drop for SEM (to connect to customer's WAN)
- POTS line for SEM (allows dial-in access via pcAnywhere)
- CSU/DSU at Hub site
- DS0 extraction at SEM site
- Two IP addresses for each HRP in system (one for each Hub, one for each Remote)
- The IP address of the serial interface of the Router at the switch which is assigned to the HRP
- Verification of the Circuit Optioning/Conditioning, e.g. 64Kbps throughout ppp link, external clocking from DSU/CSU to SPM, etc.
- The cable that connects the CSU/DSU at the Cell Site to the Transcept Hub 25-pin D female connector (See Table-1 below). Note: This connector pinout matches the ADC Kentrox DataSMART® T1 25-pin D. If this type of CSU/DSU is used a "straight-through" 25 pin D male-to- male cable will work.

Table 1-1. Hub Cell 1 V.35 Interface

Pin #	Signal Name
1.	PROTECTIVE GND
2.	XMT DATA (A)
3.	RCV DATA (A)
4.	REQUEST TO SEND
5.	CLEAR TO SEND
6.	N/C
7.	SIGNAL GND
8.	CARRIER DETECT
9.	RCV CLK (B)
10.	N/C
11.	N/C
12.	XMT CLK (B)
13.	N/C
14.	XMT DATA (B)
15.	XMT CLK (A)
16.	RCV DATA (B)
17.	RCV CLK (A)
18.	N/C
19.	N/C
20.	DATA TERM READY
21.	N/C
22.	N/C
23.	N/C
24.	N/C
25.	N/C

1.4.2 Hub/Remote Pair Configuration

A tower site can support up to three HRPs as shown in the following figure.

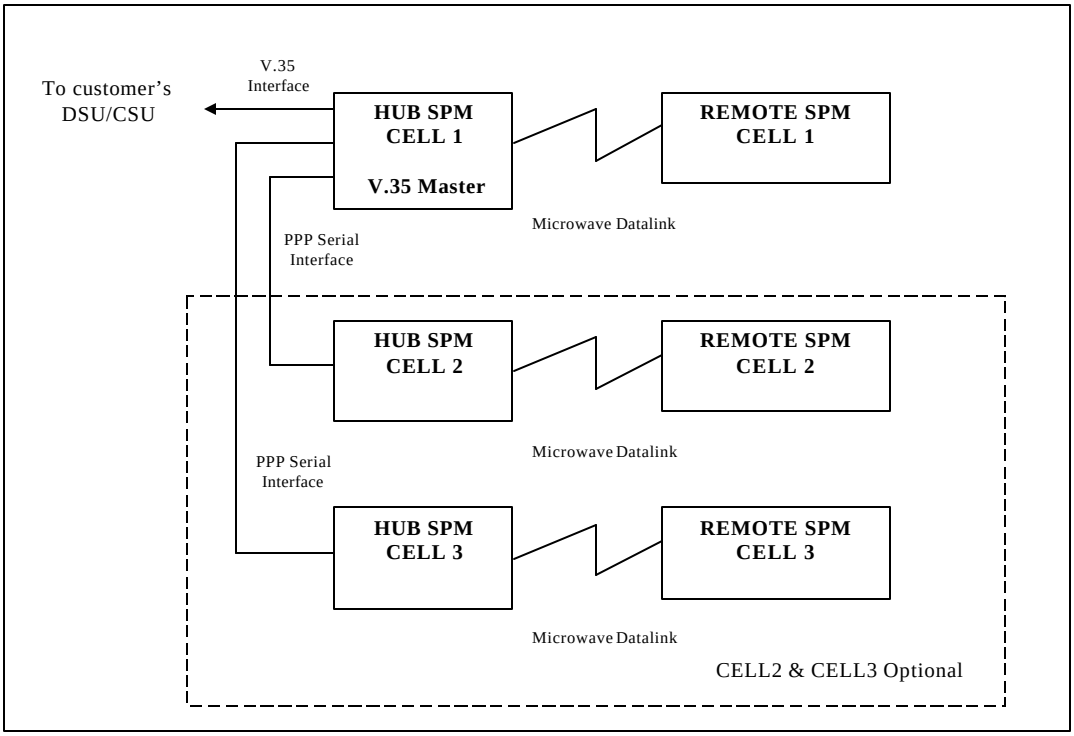

Figure 1-2. HRP Intercommunications

The Cell 1 Hub contains the V.35 interface and acts as the gateway into the customer's network for all other HRPs in the node. All Hubs communicate with their Remotes via Point-to-Point protocol (PPP) across the microwave datalink. The Cell 2 and Cell 3 Hub communicate with the Cell 1 Hub via PPP across a serial CAT5 cable.

The customer supplied IP addresses for the HRP SPMs must be entered into the network configuration file in each respective SPM. In addition, the IP address of the serail port of the router at the switch must be entered into the network configuration file of the Cell 1 Hub SPM. Once configured, the SPMs will automatically setup the network routing for SEM and HUI access each time they are powered up or reset.

1.4.3 HRP Hostname

Each HRP has two hostnames, one for the HUB and one for the REMOTE. The SPM hostname is used by system software to create valid routing tables throughout the TransCell 1900TM system. See the following for an example:

m.h.c1.node1.6cmr.id0.customer.com

This hostname contains several fields which pinpoint its corresponding SPM within the Transcell 1900TM system as follows:

Table 1-2. HRP Hostname Convention

Field	Description	Valid values
"m"	Designates the "Master" SPM in a 12 carrier system. All 6 carrier system hostnames begin with m	12CMR: m,s 6CMR: m
"h"	Designates the "HUB" SPM of the Hub / Remote pair.	"h": HUB "r": REMOTE
"c1"	"Cell One". A "Dual HUB" configuration supports two complete HRPs with one v.35 back-haul. "Cell One" is the HRP with the physical v.35 connection. "Cell two" is the second HRP, which has a PPP TTY connection to "Cell One" through a serial CAT5 cable.	"c1" : v.35 routing "c2" : Co-located second HRP with serial PPP to "c1".
"node1"	First node of several on a site list. A TransCell 1900TM "node" in this context is any site location where one or more HUB units are located.	User defined, no "special" characters or spaces.
"6cmr"	Transcept product designator	6cmr
"id0"	Optional HRP designator	User defined, no "special" characters or spaces.
"customer.com"	Customer domain ID	User Defined

2. SYSTEM ELEMENT MANAGER (SEM) SOFTWARE

2.1 OVERVIEW

This section describes the operation of the SEM application. The menus and dialogs are displayed in Microsoft Windows NT® format.

The SEM software application, installed in a SEM workstation, has the following features and capabilities:

- Automatically connects to all HRPs in the network for monitoring of alarm data
- Communicates with each HRP by connecting to the Ethernet network via a network interface card
- Provides remote user access via pcANYWHERE.
- Monitors HRP heartbeat
- Monitors and reports HRP communications alarms
- Maintains HRP time synchronization
- Records alarms (active and logged)
- Allows local display of alarms (active and logged)
- Manages alarms in alarm database
- Allows external HUI access into alarm database
- Combined alarm port that combines all alarms into single ASCII output stream
- Provides network access to the combined alarm port
- Simultaneous remote access via combined alarm port by as many as 10 multiple users
- Password-controlled access
- Uses a watchdog interface to force a system reset in the case of SEM software failure
- Provides GUI mechanism for closing alarms that are not auto-closable
- Provides GUI for allowing administrator to modify network parameters
- Provides GUI for allowing the HRP identifiers to be updated
- Automatically updates the HRP identifiers throughout the network

2.2 SEM WINDOWS

2.2.1 Network Config Window

The Network Config tab selects the Network Configuration Window. The Network Config GUI contains the SEM tree folder structure as well as the Active and Logged Alarms tabs.

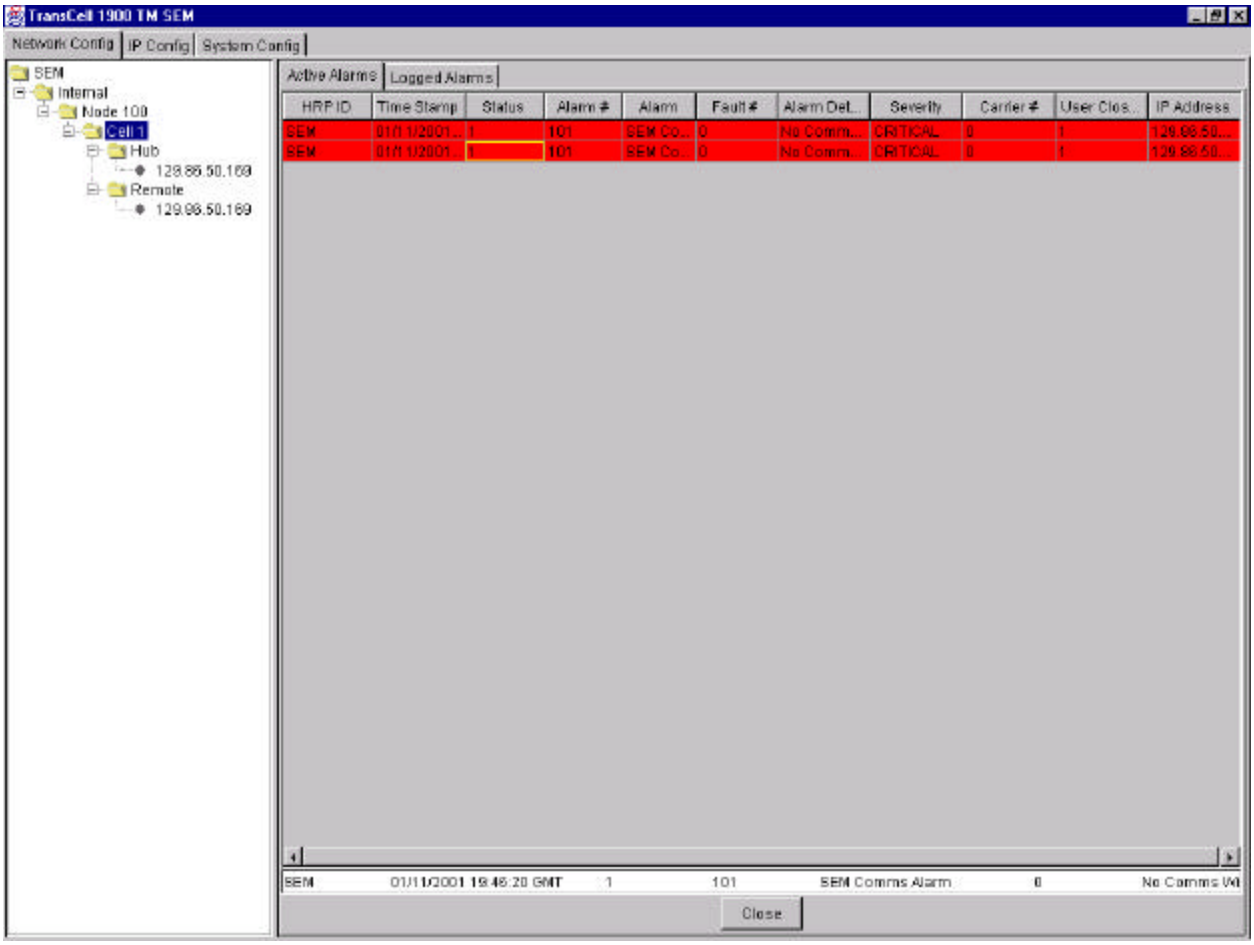

Figure 2-1. Network Configuration Window (Active Alarms Tab)

2.2.1.1 SEM Tree Structure

The SEM tree structure to the left of the screen can be extended by double clicking on the folder icons. By choosing one of the branches you can more narrowly view the alarms from selected HRPs

The SEM tree expandable folders allow you to view the configuration setup.

2.2.1.2 Active Alarms Tab

The Active Alarms tab, shown in Figure 2-1, displays the alarms that are currently active. The SEM tree structure to the left of the Active Alarms Tab can be used to view alarms for a particular Hub or Remote. In the Active Alarm display are the following items:

- *Close Alarm Selection Field* – This field is found at the bottom of the Active Alarm display. An alarm must be selected in order to close (click on open alarm). The selected alarm is displayed in the Close Alarm Selection Field (initially invisible).
- *Close Button* – At bottom of Active Alarm display. Closes selected alarm.
- *HRP ID* – HRP ID of the HRP generating alarm
- *Time Stamp* – Time alarm occurred (GMT).

- *Status* – Alarm status (1=open, 0=closed).
- *Alarm #* -- Alarm reference number.
- *Alarm* – Alarm name.
- *Fault #* -- Number of fault causing alarm.
- *Alarm Details* – Detailed description of alarm.
- *Severity* – Severity of the alarm (can also be recognized by color)
- *Carrier #* -- Carrier number(1-6) affected by alarm (non-applicable if = 0)
- *User Closeable* – Indicates whether or not User can close this alarm (1=Yes, 0 =No)
- *IP Address* – IP address of HRP generating alarm

The "column table headers" allow sorting of the alarms. For example, clicking on the *Time Stamp* header will sort the alarms according to the time that the alarm occurred. The applies to all "column table headers". Both the Active Alarms tab and the Logged Alarms tab (see next section) have this feature.

2.2.2 Logged Alarms Tab

The Logged Alarms tab, shown in Figure 2-2, is very similar to the Active Alarms tab. It displays all of the same column table headers but replaces the Close Alarm Selection Field and Close button with three new buttons:

- *Prev* – Allows user to view previous 500 logged alarms
- *Next* – Allows user to view the next 500 logged alarms
- *Refresh* – Lists the most current logged alarms

The Display Area displays the last 500 alarms in chronological order. If there are more alarms than can be viewed in a window, a scroll bar appears on the right hand side of the display.

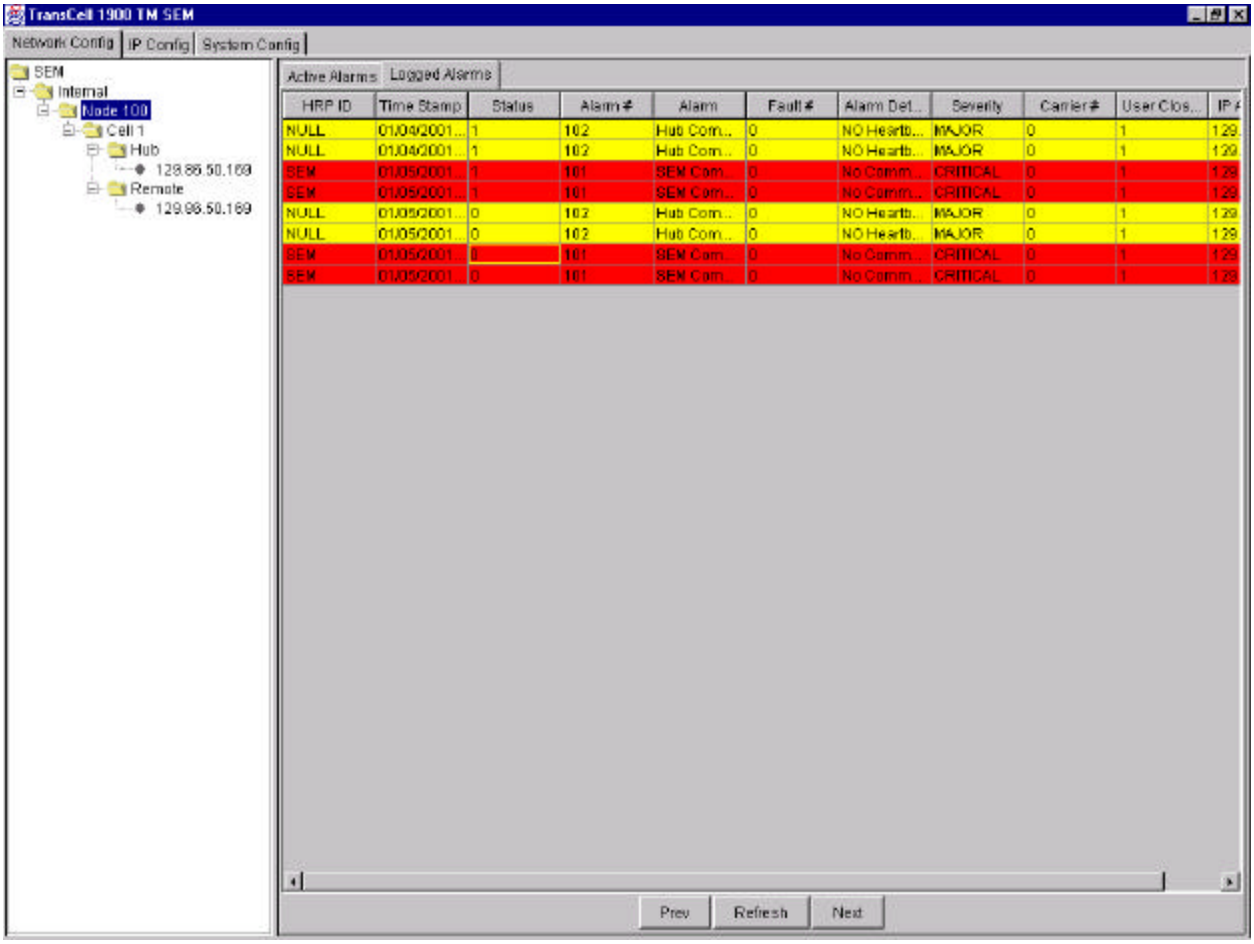

Figure 2-2. Network Configuration Window (Logged Alarms Tab)

2.2.3 IP Config Window

The IP Config tab is used to display the IP configuration window (Figure 2-3). The IP configuration window is used to enter the IP addresses for an HRP.

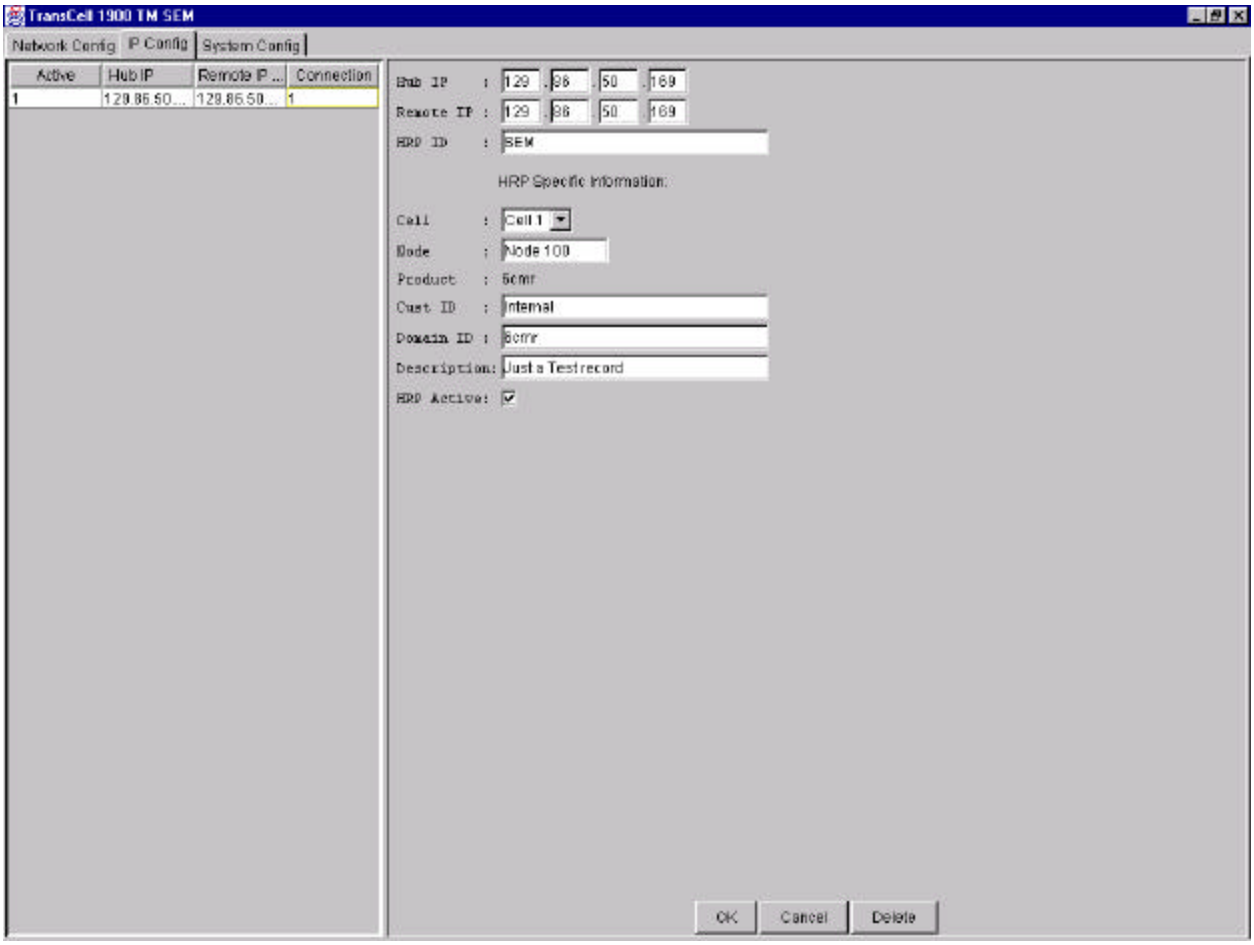

Figure 2-3. IP Configuration Window

The list area on the left side of the Window displays all HRPs that have been entered into the IP Address List. The column table headers in the list are as follows:

- *Active* – Indicates if the HRP is currently active (1=Active, 0=Inactive). If Active the SEM will monitor the HRP.
- *Hub IP* – The IP address for the Hub.
- *Remote IP* – The IP address for the Remote.
- *Connection* – Indicates if an HRP is connected (1=Yes, 0=No).

The right side of the IP Config Window provides a means to add HRP IP addresses and information. The fields and buttons are as follows.

- *Hub IP* – Enter the IP Address for the Hub
- *Remote IP* – Enter the IP Address for the Remote
- *HRP ID* – Enter the ID of selected HRP
- *Cell Pulldown* – Each cell represents a HRP (cells 1, 2 or 3)
- *Node* – A node identifies a set of up to three HRPs.
- *Product Code* – The field is fixed at 6cmr (6 Carrier Microwave Repeater)

- *Customer ID* – Corresponds to *id0* in the hostname (see section 1.4.3). This customer selected field can be used for the Hub's site name or whatever unique identifier is desired.
- *Domain ID* – Corresponds to *customer.com* in the hostname (see section 1.4.3). This customer selected field can be used to identify the customer's network domain.
- *Description* – User configurable description. This can be used to describe the address or location of the Hub equipment.
- *HRP Active checkbox* – Check this box if the selected HRP is installed and operational. The SEM will not attempt to contact this HRP until this box has been checked.
- OK Button – Adds the new information to the IP address list
- Cancel Button – Clears the information in the entry area
- Delete Button – Deletes the entry from the IP address list

Note: The data entered in these fields must correspond to the hostname and IP address data configured at an HRP. See section 1.4.3.

Note: Since the SEM generates its own alarms, the SEM's IP address must be added to the IP Config list as both a Hub and a Remote, and be marked as *Inactive*. If this is not done, the SEM generated alarms will not show up as active alarms, nor will they be logged to the database.

2.2.4 System Config Window

The System configuration window, shown in Figure 2-4, allows the user to view the constants currently set in place as well as change those constants to desired levels.

- *Display_Thread_Time_Millis* – Period in milliseconds between screen refreshes. (min=500, max=10000, default=1000)
- *Hub_Response_Timeout_Secs* – Period in seconds the SEM waits for a response from the Hub. (min=10, max=60, default=30)
- *Alarm_Port_Number* – The NOCC combined alarm port (min=0, max=65535, default=4000)
- *Hub_Time_Tolerance_Secs* – Period in seconds SEM allows SPM time variance (min=30, max=300, default=30)
- *Hub_Heartbeat_Period_Secs* – Period in seconds SEM waits for a heartbeat before setting a Hub comms alarm for that HRP (min=60, max=900, default=120)
- *Watchdog_Timeout_Secs* – Period to wait before updating watchdog card (min=30, max=300, default=60)
- *Current value column* – The current value column displays the current settings for the various constants listed.
- *Desired value column* – The desired value column allows you to either enter desired values for reference purposes or enter newly desired values. After you enter the newly desired value in a given column you can press the OK Button to make the *desired value* the actual value.

- *OK Button* – The OK Button causes data entered in the *desired value* column to replace the data currently in the *current value column.*
- *Clear Button* – The CLEAR Button will clear out all of the values listed in the desired value column.

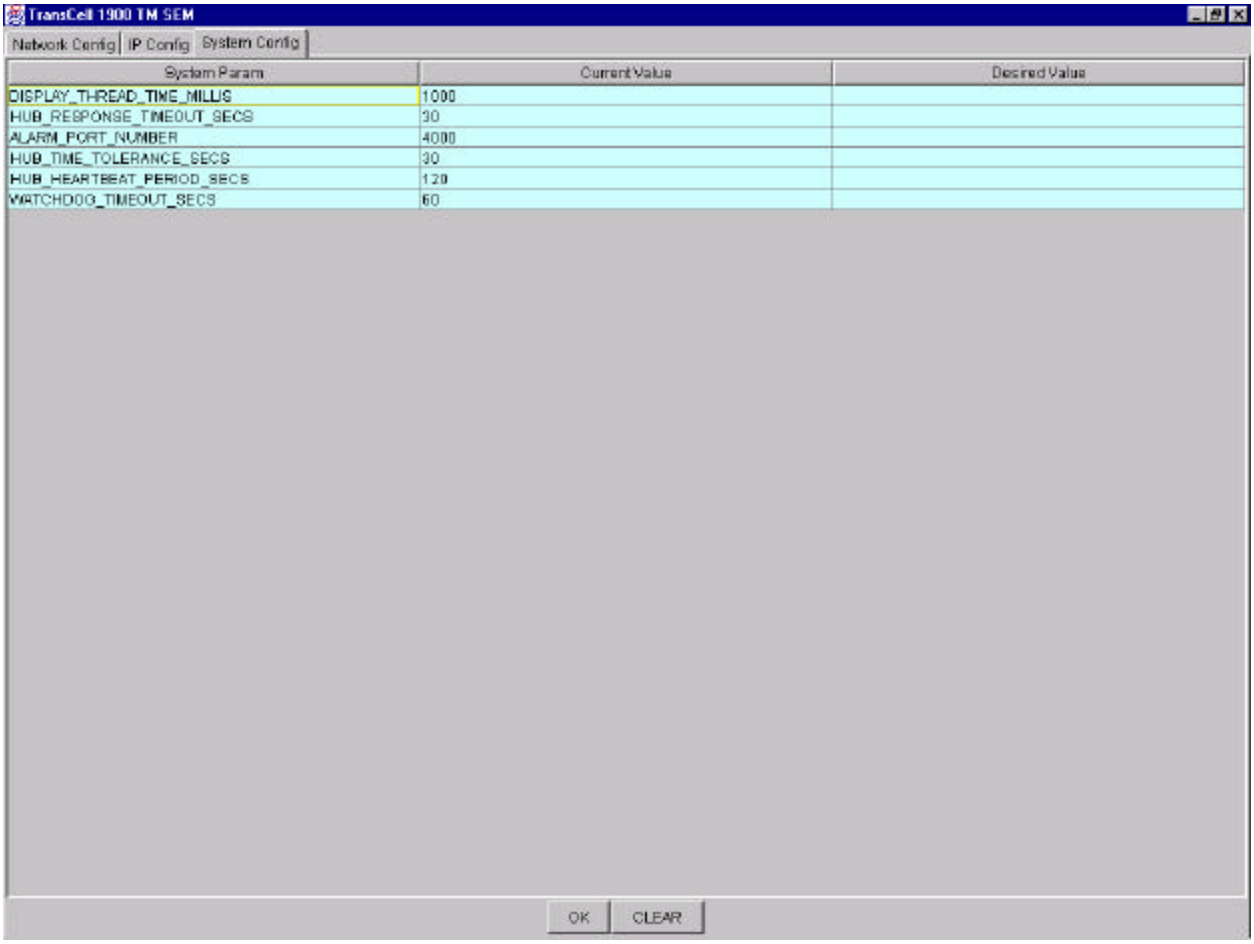

Figure 2-4. System Configuration Window

2.3 SEM POWER-ON/POWER-OFF

The SEM workstation is typically installed at the Master Switch Center (MSC). It is recommended that you use a UPS or a surge suppressor to protect the SEM workstation against AC power fluctuations.

2.3.1 SEM Workstation Power-On Procedure

- Ensure that SEM workstation and monitor are connected to an AC power source.
- Set monitor power ON/OFF switch to ON. Observe that power indicator lights.

> **NOTE**
>
> If the monitor power cable is connected to the computer, the monitor will not turn on until the computer is powered up.

- Set SEM computer power ON/OFF switch to ON. Observe that power indicator lights.

- After SEM workstation executes boot-up routine, Windows NT Desktop is displayed.
- The SEM software will automatically load and its Network Configuration window will display.
- If you are setting up the SEM because of a system error or failure it is recommended that you re-install the database software prior to setting up the SEM.

2.3.2 SEM Workstation Power-off Procedure

NOTE

The SEM workstation normally operates 24 hours a day, seven days a week. A system shutdown is only required when a SEM workstation is to be replaced or new software loaded. Shut down SEM workstation operating software per instructions in paragraph 5.1.2.

- Shutdown Windows NT® operating system software by selecting the **Start** button on the Windows NT® task bar (bottom left), and then selecting **Shut Down….**
- At Shut Down Windows dialog, select Shut down the computer? then click Yes.
- Wait for Windows NT® operating system message prompt saying that it is OK to shut off computer, then set SEM workstation power switch to OFF. Observe that power indicator goes out.
- Set monitor power switch to OFF. Observe that power indicator goes out.

NOTE

If the monitor power cable is connected to the computer, the monitor will be shut down when the computer is powered off.

3. HRP USER INTERFACE (HUI) SOFTWARE

3.1 HUI WINDOWS

The HUI is used to communicate with the SPM software in the HRPs. It is shown in Figure 3-1. It consists of a Main Window, a login dialog and a IP List editor.

3.1.1 Main Window

The parts comprising the Main HUI Window are as follows:

- *IP Address* – Provides a scrollable list of valid IP addresses of all SPMs in TransCell 1900TM System
- *HRP ID* – The customized identity of each HRP IP address
- *Status* – Indicates the current status of the communications link; connected or not connected
- *Gender* – Indicates whether this SPM is a Hub or a Remote
- *HRP Command* – Text entry location for CLI commands to be sent to the HRP
- *HRP Response* – Displays all commands entered in the HRP Command box, responses to those commands, and any errors that may have occurred. HRP Responses and the heading REPORT are shown in Blue type.*Menu Bar* – Contains pull-down menus
  - *File Menu* – Allows a user to exit the HUI
  - *Edit Menu* – Allows the use access to the edit IP edit option to add or delete IP addresses to and from the IP Addresses list box. (Only functional when a user is not yet logged into the system.)
  - *View Menu* – Allows you to view the Log File where commands and their responses are stored
  - *Options Menu* – Future.

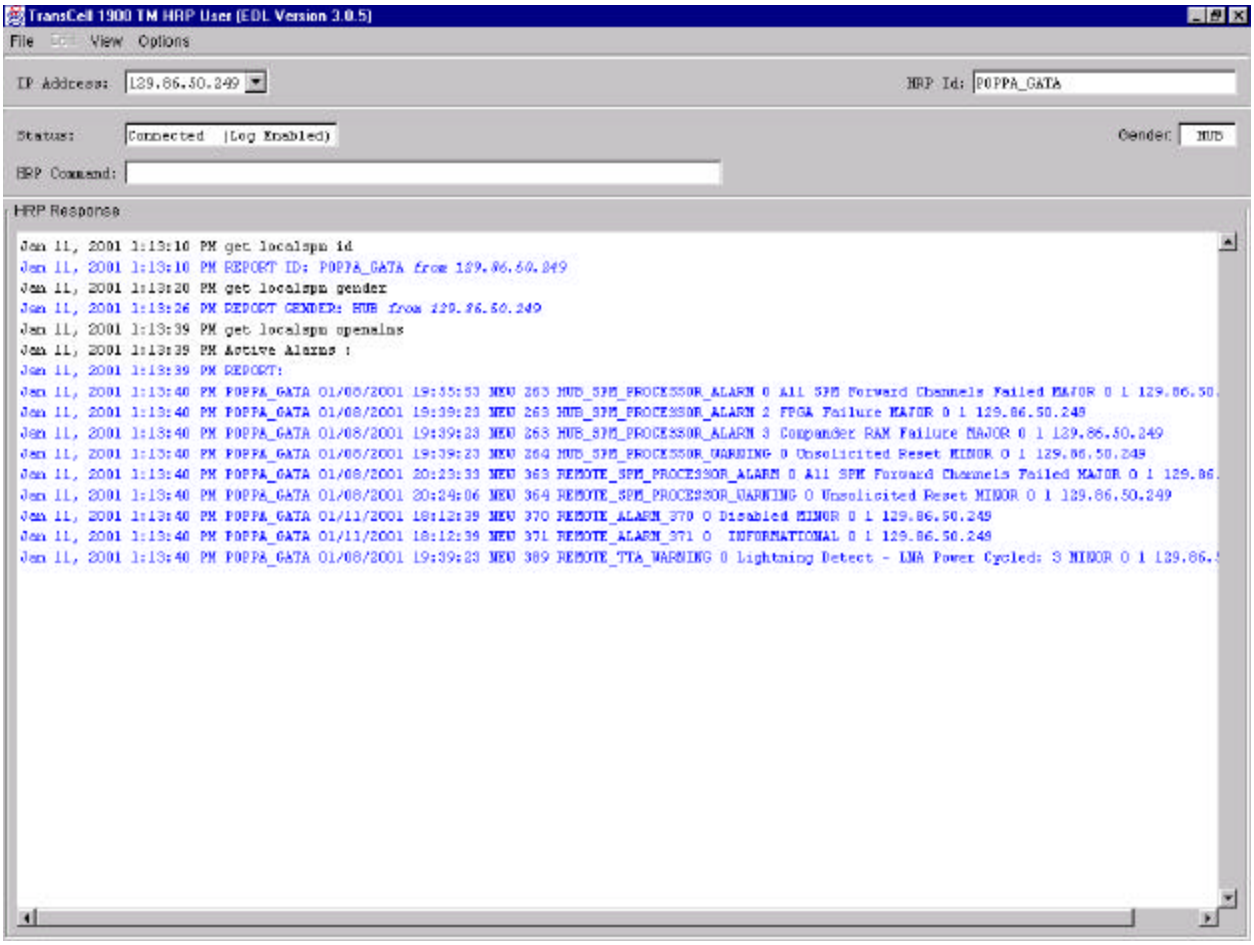

Figure 3-1. HUI Window

3.1.2 HRP Login Dialog

The HRP Login dialog is used to for entering a password. A typical HRP Login dialog is shown in Figure 3-2. Enter the selected HRP's password to connect to the HRP.

Figure 3-2. HUI Login Dialog

3.1.3 IP List Editor Option

The IP Addresses option allows the user to add and delete IP addresses from the ipaddresses.txt file without having to open that file for direct editing. This option can only be used if the HUI is not connected to an HRP. Once you input a new IP or delete an existing IP, the IP Addresses box on the HUI will be updated to reflect changes.

- *OK Button* – The OK Button will add the new IP entered in the text fields and it will also close the "IP List Editor".

- *Cancel Button* – The Cancel Button will terminate the "IP List Editor" window ignoring any data in the IP text field.
- *Add Button* – The Add Button will add the new IP entered in the text fields and leave the Editor open for more changes to take place.
- *Delete Button* – The Delete Button will remove the selected IP from the ipaddresses.txt file and from all other lists and boxes containing the selected address. You can either type the IP into the text fields or more simply click on the desired IP in the adjacent list.

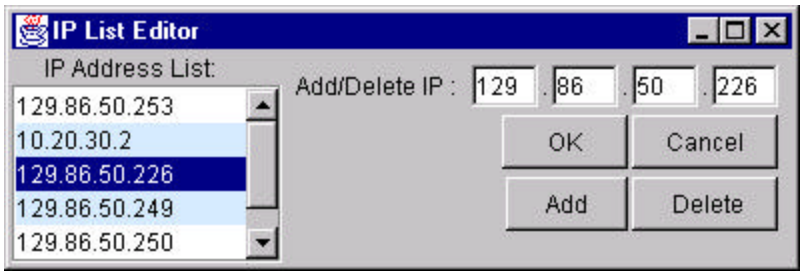

Figure 3-3. HUI IP List Editor Dialog

4. SEM/HUI INSTALLATION

Both applications are installed in the computer designated as the SEM workstation. The HUI software may be installed in any other suitably configured Windows NT computer as well. The following procedures are provided for performing common tasks with respect to SEM/HUI software.

CAUTION

Use the SEM application *on the SEM workstation only*. Simultaneous use of the SEM application by two or more computers connected to the same TDMA network will cause these applications to constantly contend for control and thereby render the alarm monitoring function inoperative.

4.1 JAVA RUNTIME ENVIRONMENT (JRE) INSTALLATION

Both the SEM and HUI applications are written in Java. In order for these applications to run, they require that Sun Microsystems' Java Runtime Environment (JRE) software be loaded. The JRE is preloaded on the SEM workstation. Instructions are provided here in case the software should become corrupted, or if a JRE software upgrade should become necessary.

a. Insert the CD-ROM provided by Transcept labeled "Java Runtime Environment" into the CD-ROM drive.

b. Using NT explorer, click on the file jre1_2_2-001-win.exe.

c. An installation program will guide you through the installation process.

d. Accept the license agreement.

e. Accept the default destination folder: C:\Program Files\JavaSoft\JRE\1.2.

f. The JRE will install and the installation program will exit automatically upon installation completion.

4.2 HUI SOFTWARE INSTALLATION

The HUI software is installed as follows:

- Insert the floppy labeled "HRP User Interface (HUI)" into A:\ drive. The floppy contains a self-extracting archive file that will auto-extract the files into the correct directory structure.
- Using NT explorer, select the A:\ drive and double click on the .exe file. Accept the default directory structure.
- Click on the Unzip button. After the unzip process is complete two directories should have been created: **config** and **dev_hui**. Click on the Close button.
- If this a new install, you will need to create a shortcut pointing to the following:
- C:\dev_HUI\classes\com\Transcept\tdma\HRPUser.bat.

4.3 SEM SOFTWARE INSTALLATION

4.3.1 SEM Application Software Installation

The SEM software is provided by Transcept on a CD-ROM. If this is a first time install, you will have to set the CLASSPATH variables in order to run the class files.

- Setting the CLASSPATH variables
  - To set the CLASSPATH, right click on MyComputer.
  - Choose properties from the pulldown.
  - Click on the *Environment* tab.
  - Type: *CLASSPATH* in the Variable text field.
  - In the Value text field type: .;*c:\dev\mysql.jar;%CLASSPATH%*. The CLASSPATH lets the computer know where to look for java files associated with the program that is running. In this instance we are telling it to look under c:\dev\mysql.jar. It is VERY important that the classpath be typed correctly. It puts the starting directory in the classpath.
  - Click the Set button then click OK.
- Insert the CD-ROM labeled "SYSTEM ELEMENT MANAGER" into the CD-ROM drive.
- Using NT Explorer, select the CD-ROM drive. There should be a folder labeled **dev** on the CD.
- Click and drag the folder labeled **dev** from the CD-ROM onto the **[C:]**
- If this a new install, you will need to create shortcuts pointing to the following batch files: C:\dev\SEM.bat, C:\dev\Watchdog.bat, and C:\dev\DatabaseBackup.bat.
- If this a new install, you will also need to put the c:\dev directory on the SEM workstation's path. To do this you must have administrator privileges. Right click on My Computer and select Properties. Select the *environment* tab. In the System Variables area find and select path. In the Value box hit the right arrow key to go to the end of the line. Then type: ;c:\dev and hit the Set button. Then hit the Apply button followed by the OK button.

4.3.2 SEM Database Software Installation

The SEM software uses a MySQL database to store and process alarm data. Therefore the MySQL database must be installed prior to using the SEM.

The SEM workstation comes ready with the database installed. If for some reason you need to reinstall the database follow the instructions below.

- Insert the CD-ROM labeled "MYSQL DATABASE" into the CD-ROM drive.
- Using NT Explorer, select the CD-ROM drive.
- Double click on the **MySQLselfExtract.exe** file. The contents will be put into D:\programs\mysql\bin by default if you choose not to specify a different drive. Select the disk drive that has the most free space on it. Click on the Unzip button.
- Click on the Close button.

- Select the disk that you had the files unzipped to. Navigate to the **\programs\mysql\bin** directory.
- Click on **Setup.exe** to install the database.
- An installer window will open up to guide you through the MySQL installation.
- Click Next for the first two windows. On the window titled "Choose Destination Location" c:\mysql will be the path already in the box. **Do not accept this default**.
- Click on the button labeled Browse.
- At the bottom of the display there is a pull-down menu labeled drives:. Click on it and select the drive that has the most free space. The letter drive you selected will appear in the path text area above.
- After the letter drive you chose, type: *mysql*. It should read as <drive letter>:\mysql
- Press OK and click Next.
- Choose a typical installation. Now press OK.

4.3.3 SEM Database Setup

There are a few simple steps to follow when setting up the database. Special care needs to be taken to type SQL statements exactly as seen in the steps to follow. SQL is case sensitive when it comes to database and table names.

- Open up a command window by clicking on the start menu and selecting the option labeled Run. Type *cmd* in the text field and press enter.
- To get to the proper root directory (the directory where you chose to install MySQL) type ***<letter>:*** where *letter* would be the letter of the drive where MySQL is installed.
- Now specify the path by typing: *cd \mysql\bin*
- At the prompt type: *mysql–nt –install*
- Next type: *net start mysql*
- For initial login to the database simply type: *mysql –u root* at the prompt.
- Note: Later you will login differently by typing something like the following at the prompt: mysql --user=semuser --password=*passwordHere*
- Once you have the prompt that looks like **mysql>** type: *use mysql*
- Typing the above statement will give the root user access to the mysql database. There is no password for the root user initially.

Setting a Password For the Root User

Once you are logged into MySQL you can perform various tasks among which is changing passwords. Primarily you may want to set a password for the 'root' user. The syntax for doing this follows:

mysql> UPDATE user SET password=PASSWORD('new_password') WHERE user='root';

If you do not change the password promptly, there is a risk of non-authorized access to the database.

User Levels in MySQL Explained

There are mainly two user levels in MySQL: **administrator** and **user**. If you log on as root you are using the **administrator** level. As an administrator you can create new users and give those users certain restricted privileges. As an administrator you can also give a user administrative privileges. Generally you do not want to give a user administrative privileges because they could inadvertently delete tables or the entire database.

For the SEM operations, the only privileges you need be concerned about are update, delete, insert and select. These are the privileges that should be given to any new users you allocate. You may want to GRANT all privileges to a user if that user is going to be you. Doing such is unnecessary but you may wish to log in under a username you more commonly use instead of 'root'. The syntax for granting all privileges to a user is:

GRANT ALL PRIVILEGES ON *.* TO 'some username here' IDENTIFIED BY 'some_password' WITH GRANT OPTION;

Giving Database Privileges to the New User

The privileges that we are going to give are the only privileges necessary for the semuser to get all of the desired information from the database

Type: GRANT update,delete,insert,select ON *.* TO semuser@"%" identified by 'livefreeordie';

Type: GRANT update,delete,insert,select ON *.* TO semuser@localhost identified by 'livefreeordie';

Type the above statements **exactly**. Make sure to include the single quotes around the password livefreeordie. Once you have done this you have created a valid user for the database.

Creating the SEMDB

At the **mysql>** prompt type: *CREATE database SEMDB;*

You have now created the SEM database shell. Remember that if you want to access the SEMDB you must type the database name in all capitals just as you created it.

In order to access any information in the newly created database type: *use SEMDB*

Creating and Initializing the Tables

A script file has been previously written and is stored on the SEM machine d: drive.

At the **mysql>** prompt type: \. *<drive letter>:\sqlscripts\mainsqlscript.sql*

To verify that the tables were created type: *show tables;*

You should see a list of eight tables that were created from the script file.

To verify that the tables were initialized type: *select * from systemcontrol;* You should see some values. This indicates that the tables were initialized from the

sql Script file. A separate script file exists for all of the tables if you wish to recreate only one or two of the tables.

Everything should be set up properly at this point. To exit from the database type: *quit* at the prompt.

Repairing Corrupted Database

If for some reason the database has been corrupted there are a four procedural steps to follow in order to restore it to full operational status:

- Restore systemcontrol table in SEMDB.
- Reset dbinsertion
- Drop openalarm and closedalarm tables from the database.
- Recreate the openalarm and closedalarm tables.

The easiest way to perform all of these tasks is to "drop" the four tables mentioned above and then run the script file that was used to create the tables:

- Login to MySQL using the root user and password. (See Section 3.3.2)
- At the mysql prompt type: *use SEMDB*
- To drop the tables type: *drop table openalarm, closedalarm, dbinsertion, systemcontrol;*

Note:
Do not drop the **dbinsertion** table without dropping the openalarms and closedalarms tables first.

- Type: *show tables;* to verify that the tables have been dropped.
- In order to restore the tables, type: **\.** *<drive letter>:\sqlscripts\mainsqlscript.sql*

The tables that were dropped should be restored and the database should be repaired.

Manually Resetting closedalarm, openalarm and dbinsertion Tables

The process for resetting the tables is the same as described in previously.

4.3.4 Autologin of SEM software

The SEM workstation should be set up so that the SEM software loads automatically upon power up. No login GUI will appear. Login as SEMUser will happen automatically. This is done through the Microsoft applications TweakUI and AutoExNT. Autologin setup instructions are provided here in case the hard disk has crashed or has become corrupted. You will need **administrator** privileges to do this installation.

Obtaining and Installing TweakUI and AutoExNT

- Insert the SEM Workstation Drivers CD-ROM and use NT explorer to select the TweakUI directory. (As an alternative you can download the program from URL: http://www.microsoft.com/Windows95/downloads/contents/WUToys/W95PwrToysSet/Default.asp)

- Copy or download the software to Desktop. If you are working off of the SEM CD there is no TweakUI.exe file. The purpose of this file is to unzip the others, however they are provided already unzipped on the CD. Skip ahead to where you find **tweakui.inf**.
- On your Desktop double click on the **TweakUI.exe** icon.
- Extract the files to: **C:/TweakUI**.
- Using WindowsNT Explorer® explore your C:\ drive.
- Double click on the folder labeled **TweakUI** (where the files unzipped to).
- You should see four files. Right click on the file labeled **tweakui.inf**.
- Click Install on the menu that appears. TweakUI is now installed on your computer. Close the Help window that appears by clicking the X in the upper right hand corner of the window.
- Use NT explorer and select the AutoExNT directory on the CD-ROM. (As an alternative you can download the files from http://www.cs.ucc.ie/downloads/NT/autoexnt/.) Copy the files **Autoexnt.exe**, **Instexnt.exe**, **Servemess.dll**, and **Autoexnt.bat** to the C:\WINNT\system32 directory.
- Open up a command prompt and go to C:\WINNT\system32 by typing:

  C:

  cd C:WINNT\system32
- At the prompt type *INSTEXNT install*. The AutoExNT program will be installed. Close the command prompt window.

Setting Up the Auto LogIn Feature

This procedure will show how to set up TweakUI to automatically login as **SEMUser** with password **semuser** and automatically launch the SEM software.

- To set up auto logon double click on **My Computer**.
- Double click on **Control Panel**.
- Find the **TweakUI** icon and double click on it. A window will appear.
- There are several tabs at the top of the window. Click on the tab labeled **Logon**.
- You will see two text fields. One of them should contain your user name. Change the username to read *SEMUser*. In the other text field type in the password currently used for SEMUser logon. The password upon delivery is **semuser.** It is possible that the password has been changed since delivery of the SEM.
- Put a check in the box labeled "Log on automatically at system startup". Do this by clicking the mouse in the box.
- Click the OK Button.
- Open up Control Panel and click on **Services**.
- Under services click on **AutoExNT** and click the Startup button.
- Under Startup Type check **Automatic** and click OK.

- Log off from the current session by selecting **Start/Shut Down**, selecting "Close all programs and log on as a different user" and click the Yes button. You should login automatically and the SEM software should launch.

Disabling the Auto LogIn Feature

In order to be able to login as a different user (such as administrator) you will need to disable the autologin feature. The simplest way to do this is to change the password to SEMUser so the autologin feature fails.

- Type the **ctl-alt-del** key sequence.
- Click on the **Change Password** button in the Windows NT Security GUI.
- In the Change Password GUI type in the Old Password: **semuser**, the New Password: **test**, and Confirm New Password: **test**. Click on the OK button.
- A message will pop up indicating your password has been changed. Click the OK button.
- Click the Cancel button on the Windows NT security GUI to return to your session.
- Log off of the current session as explained in the section above. When the system tries to login as SEMUser it will fail because the password has changed. You may now select a different Login name and password, or type in the new password, test, to login as SEM User.

When you have finished your task requiring the different login name, be sure to log back in as **SEMUser** and change the password back to **semuser** so that if power is lost, the SEM workstation will autologin and bring back the SEM software. NOTE: To permanently disable autologin you must log in as Administrator and disable the autologin service from the Control Panel Services. There should be no need to do this.

5. SEM OPERATION

5.1 SEM

5.1.1 Launching SEM Software

The SEM software should have launched automatically at startup. The SEM software consists of the SEM GUI application and a Watchdog timer application. The Watchdog timer converses with the SEM application to ensure that the SEM application is operational. If the SEM application should crash, the Watchdog application will reboot the SEM workstation.

Both of these applications should have launched at startup. If autologin has been disabled, or if you have closed the SEM software and wish to reopen it, double-click on the SEM icon on the desktop to launch the SEM application. Then double-click on the Watchdog icon on the desktop to launch the Watchdog timer application.

Once the SEM software is operating the user should enter the IP addresses and specific node information for each HRP in the network (see section 2.2.2). Once the HRPs have been entered, the SEM software will automatically contact each HRP and log alarm information as necessary. Most alarms are closed automatically when the cause has been corrected. There are some User-closeable alarms. See the OAM manual for alarm descriptions.

5.1.2 Closing SEM Software

The SEM application has a 24/7 runtime and should be shut down only for administrative maintenance. To initiate the SEM software shutdown routine, select **EXIT** in the **FILE** pull-down menu at the upper left corner of the SEM application window. The **EXIT** command will disable the SEM hardware watchdog timer and close the SEM workstation software without generating a SEM Unsolicited Reset Alarm.

CAUTION
Failure to exit the SEM workstation software properly may result in problems with software the next time the software is initialized.

5.1.3 Remote Access of the SEM

The SEM workstation is supplied with Symantec's pcAnywhere software to provide a means to access the SEM remotely. The workstation must be connected to a POTS line to provide dial in access.

5.1.4 Setting up the SEM workstation as a Host

Before a remote SEM session can be established, the SEM workstation must be configured to accept the call over its 56K modem. To do this you must first add the host session then set up new caller parameters.

5.1.4.1 Adding a Host Session

a. Click on the Symantec pcAnywhere icon, or select **Start/Programs/Symantec pcAnywhere**.

b. When the pcAnywhere GUI appears, click on the Be a Host PC button as shown in Figure 5-1.

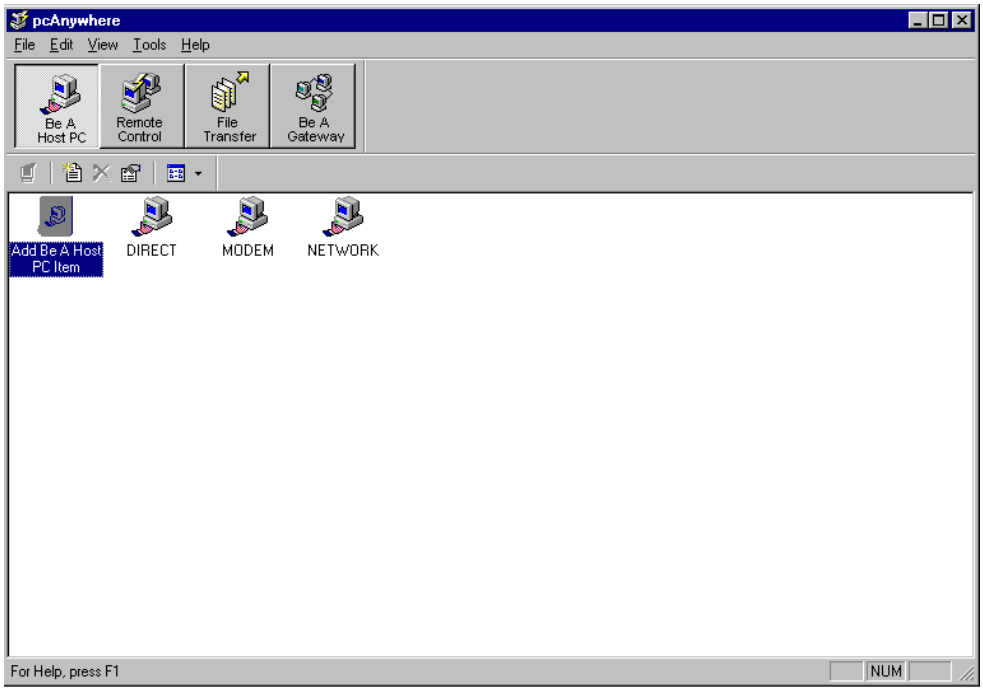

Figure 5-1. pcAnywhere "Be a Host PC" GUI

c. Double-click on the "Add Be A Host PC Item". A series of GUIs will appear to walk you through the Add process. Figure 5-2 shows the first of these GUIs. Enter the name of the session. This example names the session "Transcept". This name will appear beneath a new PC icon in the "Be a Host PC" GUI when you are done with the Add process.

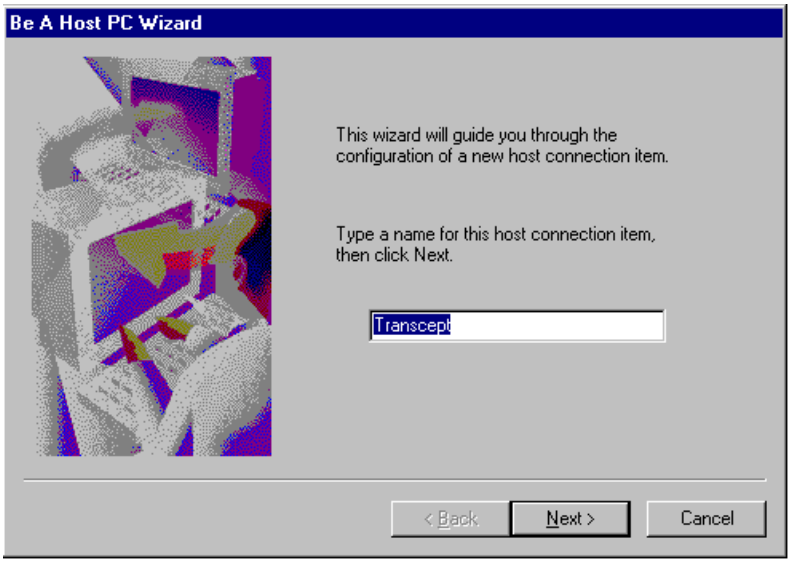

Figure 5-2. Naming the Host PC Session

d. Click the Next button to bring up the connection device GUI (Figure 5-3). The modem installed in the SEM workstation should be highlighted. Accept this default by clicking on the Next button.

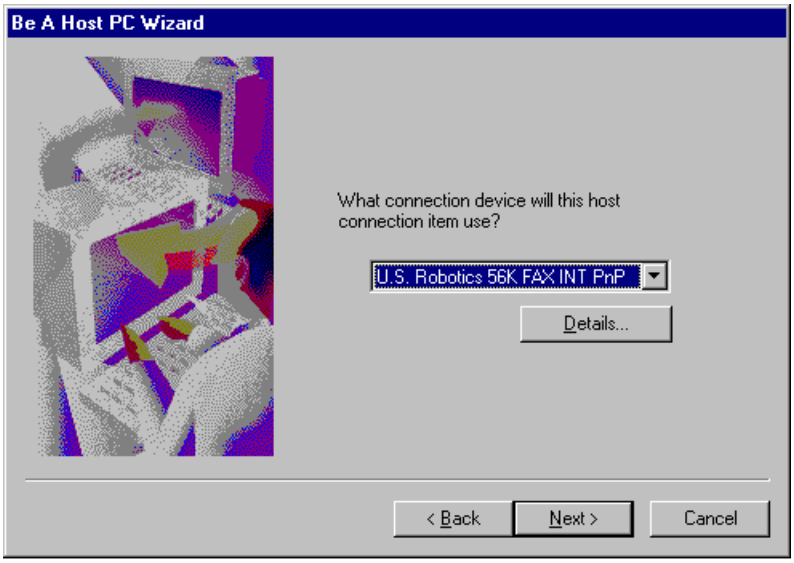

Figure 5-3. Connection Device GUI

e. The Security Level GUI will appear (Figure 5-4). Accept the default to use pcAnywhere calling security. We will setup the security parameters later in this procedure. Click on the Next button.

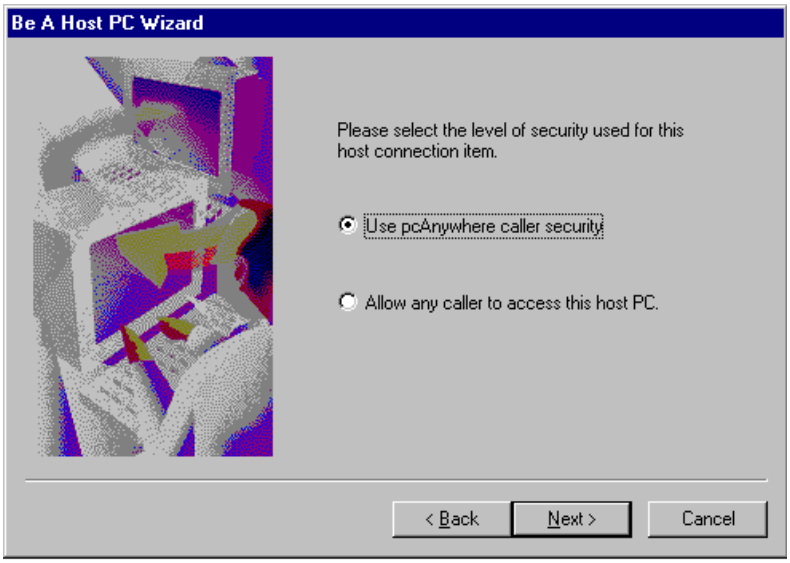

Figure 5-4. Security Level GUI

If you have never before set up a Host PC session on this workstation, pcAnywhere will automatically take you into the "Add Caller" wizard. If this happens, jump ahead to

section 5.1.5 step c. and follow instructions from there. Upon completion of the "Add Caller" you will be returned to the "Successful Completion" GUI shown in Figure 5-5. If you have set up a Host PC session previously, you will proceed immediately to the "Successful Completion" GUI. The default checkbox selecting "Automatically launch this host upon wizard completion" will default to on. Uncheck this box by clicking on the check mark. Then Click on the Finish button.

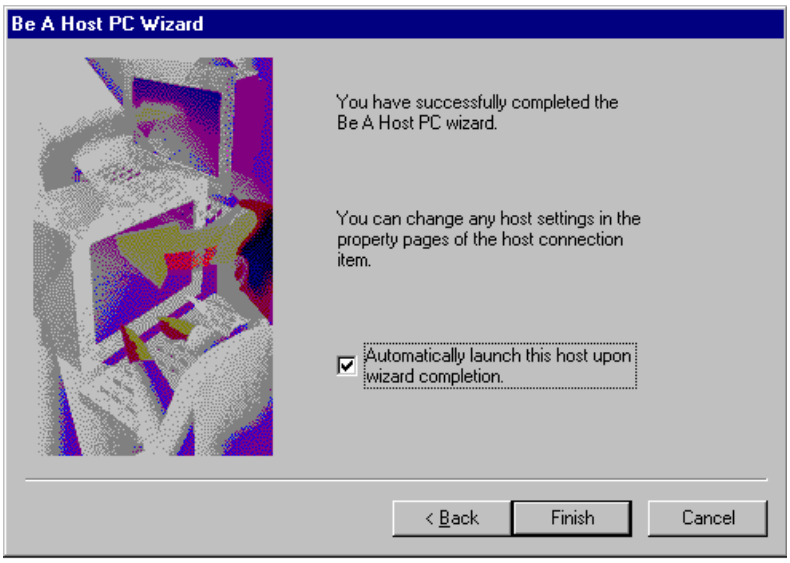

Figure 5-5. Successful Completion GUI

f. When the Successful Completion GUI clears, the session just created should appear as an icon in the Be a Host PC GUI as shown in Figure 5-6.

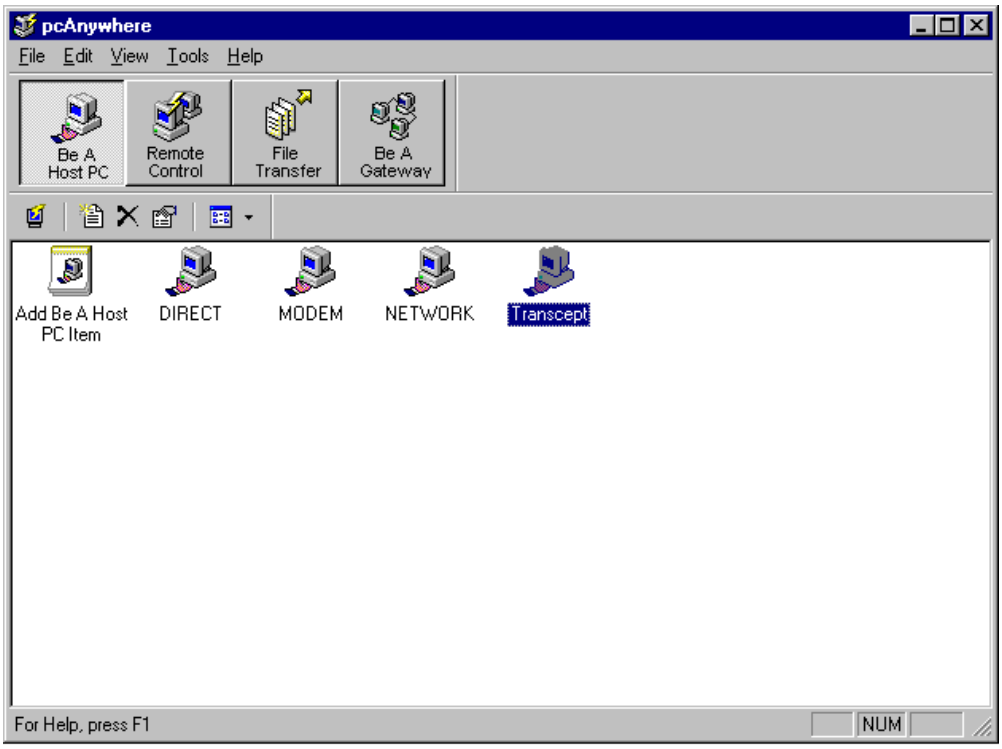

Figure 5-6. New Session Icon Appears

5.1.5 Establishing New Caller Parameters

a. In the Be a Host GUI, right click on the session icon you created in the last section. Select the properties item from the pop-up menu. When the Properties GUI appears select the "Callers" tab as shown in Figure 5-7.

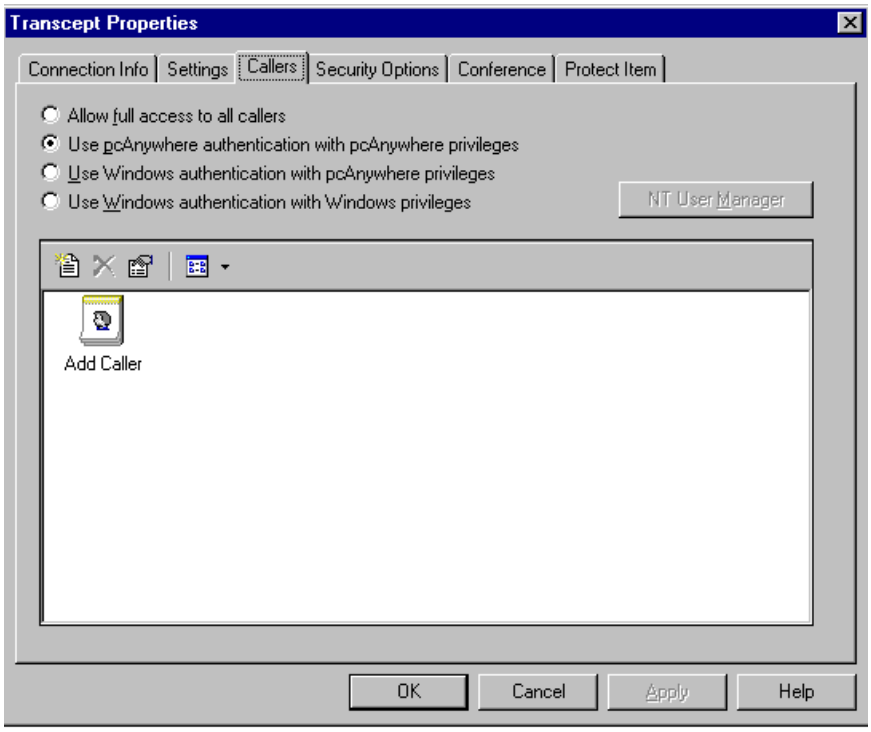

Figure 5-7. Callers Tab in Properties GUI

b. Double click on the Add Caller icon to launch the New Caller Wizard (Figure 5-8).

c. Enter the Caller name. In this example we have entered "Transcept" as the caller name. Click on the Next button to proceed.

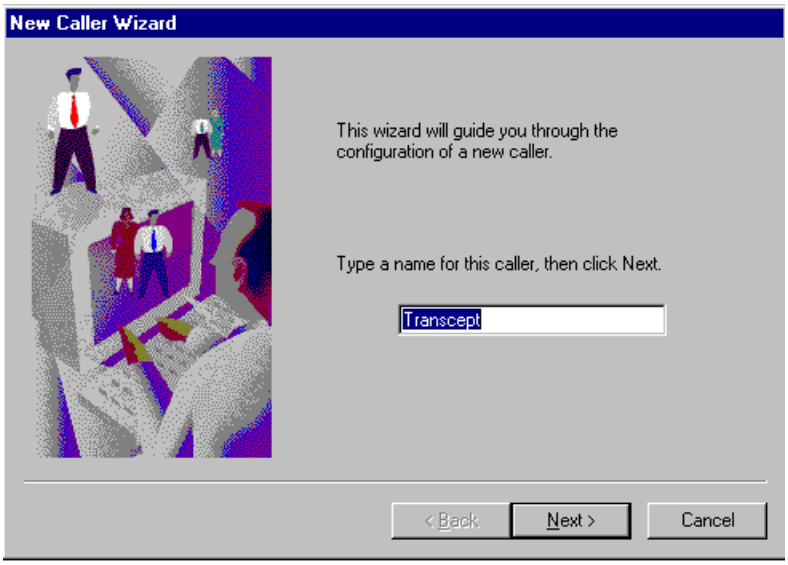

Figure 5-8. Caller Name Entry

d. The next GUI allows entry of the remote user's login name and password. These will be entered at the remote workstation in order to establish a pcAnywhere connection with the Host PC (the SEM workstation). Enter the remote login name and password. The example in Figure 5-9 uses the login name of "Transcept" and password of "semuser". Both the login name and password are not case sensitive. The password will be blanked by asterisks as you enter it. Once finished, click the Next button.

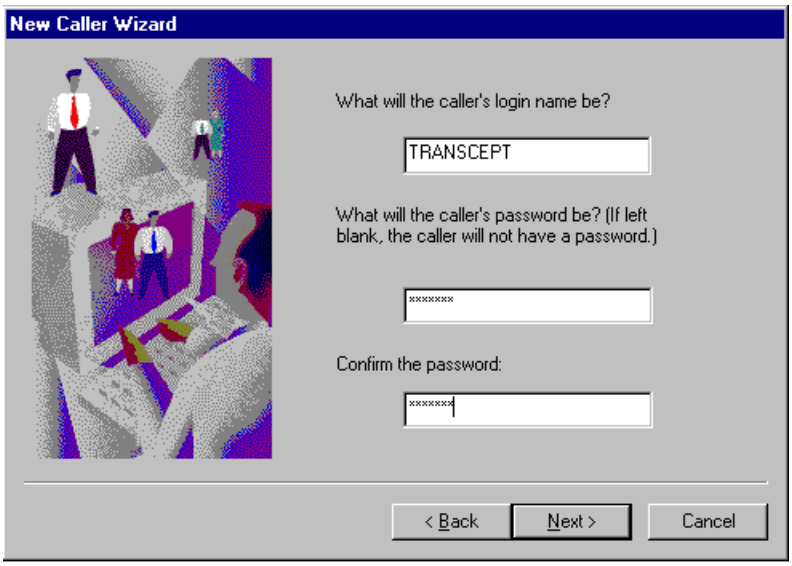

Figure 5-9. Login Name and Password Entry

e. The Successful Completion GUI (Figure 5-10) will appear. Click the Finish button to close the Add Caller Wizard.

Figure 5-10. Successful Completion GUI

f. You have now created a Host PC session that will allow a user to login to the SEM workstation using a login name and password. To activate the session, i.e. to set the SEM PC to expect an incoming caller, double click on the session icon. The pcAnywhere "Be a Host PC GUI" will disappear. The SEM workstation will now accept a remote login.

5.1.6 Logging into the SEM from a remote Workstation

The following steps describe the procedure for logging onto the SEM workstation over a POTS line.

a. On the remote workstation click on the Symantec pcAnywhere icon, or select Start/Programs/Symantec pcAnywhere. A GUI similar to that shown in Figure 5-1 above will appear. This time click on the "Remote Control" button to select the remote control options.

b. From the Remote Control GUI double click on the MODEM icon. The phone number entry GUI will appear (pcAnywhere Waiting) as shown in Figure 5-11. Enter the phone number of the SEM, then click OK.

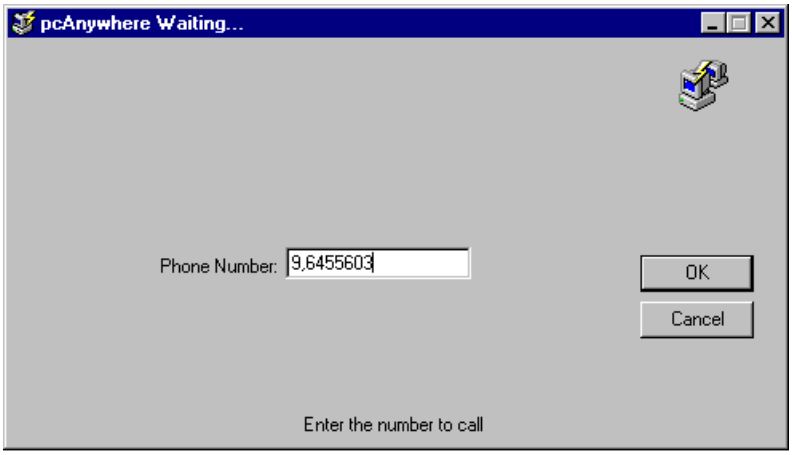

Figure 5-11. SEM Phone Number Entry

c. pcAnywhere will access the modem and dial the SEM's phone number. A Connecting GUI will appear during the dialing and connecting process. If the SEM workstation has been set up to receive phone calls, it will answer the call. The remote workstation will acknowledge connection by displaying the Login GUI shown in Figure 5-12. Enter the login name and password created back in the Security section. In this example we are using a login name of TRANSCEPT and a password of SEMUSER. The login and password are not case sensitive. The password will be blanked by asterisks. Click on the OK buttton.

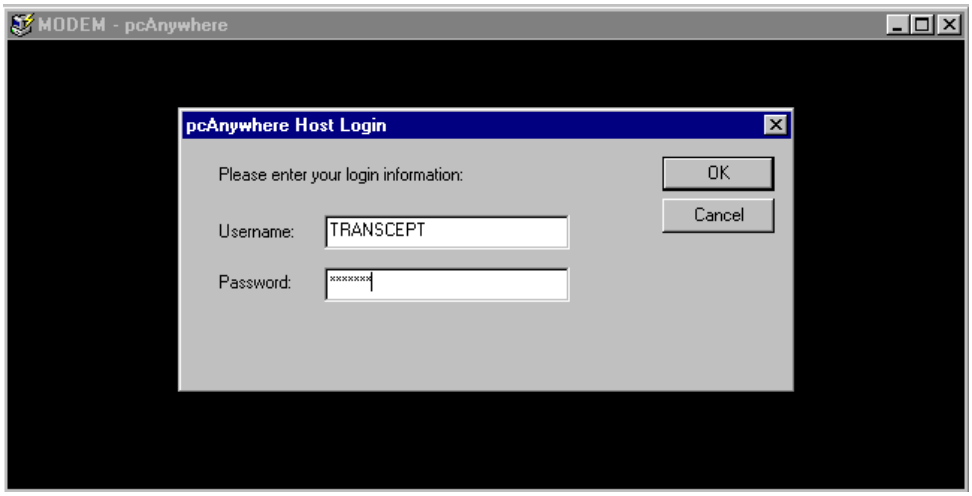

Figure 5-12. Remote Login GUI

d. If everything was entered correctly pcAnywhere will display the SEM's desktop on the remote workstation as shown in Figure 5-13. You may now monitor system activity and modify SEM parameters as if you were local to the SEM workstation.

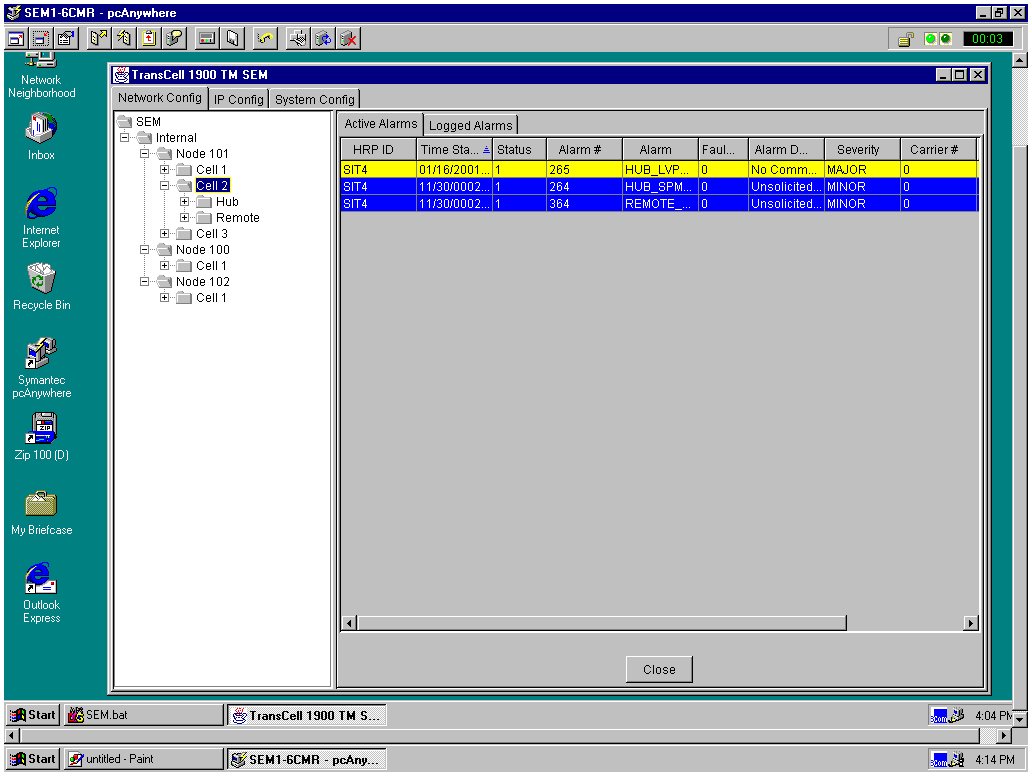

Figure 5-13. Remote SEM Session

e. To disconnect the pcAnywhere session, press the button with the red X (rightmost button), and then click the Yes button on the resulting popup GUI.

6. HUI OPERATION

6.1 HUI

6.1.1 Launching HUI Software

The Windows NT® Desktop is displayed at power-up or reset. At the Windows NT® Desktop, perform the following steps to the initialize HUI software application:

- If a HRP User icon is displayed on the Windows NT® Desktop, double-click the icon to start HUI software application. The HRP User dialog shown in Figure 3-1 appears.
- If no HRP User icon is displayed:
  - ♦ Launch Windows NT® Explorer by right clicking the **Start** button and selecting Explore. The Windows NT® Explorer Window appears.
  - ♦ Using Windows NT® Explorer, locate HRPUser.bat file in C:\dev\classes\com\Transcept\tdma, and double-click on file name. The HRP User dialog shown in Figure 3-1 appears.

6.1.2 Logging In via HUI

To log in to the HRP User Interface, perform the following steps:

- At *IP Address:* box of HRP User dialog, click on down arrow, and select an IP address by clicking on it once.
- After selecting IP address, an HRP Login dialog appears. Type user password (currently **123**), and click OK. The *HRP ID:* box will display name of site logged into. The *Status:* box will indicate *Connected*.
- Commands may now be entered into *HRP Command:* box of HRP User dialog. See Section 7.2 for a list of the commands and command language syntax.

NOTE

All commands to and responses from the HRP, along with any errors, are echoed in the HRP Response window of the HRP User dialog. They are also entered into a log file in the C:\Logfiles folder.

6.1.3 Logging Out

To log out of the HRP User Interface, type the command LOGOUT HRP in *HRP Command:* box of HRP User dialog, or select *None* in *IP Address:* box.

6.1.4 Closing HUI Software

Closing HUI software is similar to exiting from most other Windows NT® based programs. To initiate the HUI software shutdown routine, select the [X] box at the upper right corner of the HRP User dialog. This shutdown will log out of any active HRP session and close the HRP User software.

6.1.5 Portable Computer IP Address Change Procedure (For Local HUI Use)

To log into the Hub or Remote SPM at the **local** cell site, it is necessary to set the IP address in the TCP/IP setup file on the laptop computer being used as the HUI. (The computer must also have the HUI software installed.)

Note: If operating a HUI non-locally, i.e. on the customer's network, DO NOT follow these steps.

6.1.5.1 Setting Computer TCP/IP Configuration

The computer's new IP address must be set to be in the same subnet as the SPM's IP address. The IP address to be used via the SPM's ethernet port can be obtained from the network file located in the /etc directory of the SPM's filesystem.

To obtain this IP address from the SPM.

- connect the laptop's COM1 serial port to the SPM's console port.
- Open the Hyperterminal application direct on COM1.
- Setup the COM1 port for 9600 baud, 8 bits, no parity, 1 stop bit (9600-8-N-1).
- Hit the "Enter" key to obtain a login prompt.
- Login to the SPM with login: **user** and password: **maintain**
- At the # prompt enter **cat /etc/network**.
- Check the display for the address next to **ETH_IP=**. Record this IP address as it will be what you use to communicate with this SPM.
- In Hyperterminal type **exit** to logout of the SPM.

You must now set your laptop to be in the same subnet as the SPM. Before changing IP parameters on your laptop computer, record ALL settings that are to be changed. These parameters may need to be re-entered after the SPM has been re-configured. Perform the following steps to log into a SPM:

Connect a **crossover** 8-pin Ethernet® cable from laptop's Ethernet port to the ENET port on the SPM.

Right-click on Network Neighborhood icon on Windows NT® Desktop to display popup menu shown in Figure 6-1. Network Neighborhood Pop-up

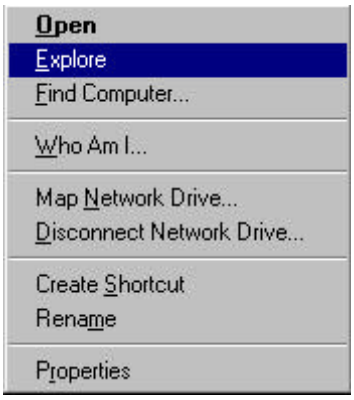

Figure 6-1. Network Neighborhood Pop-up

Click on Properties to display Network dialog.

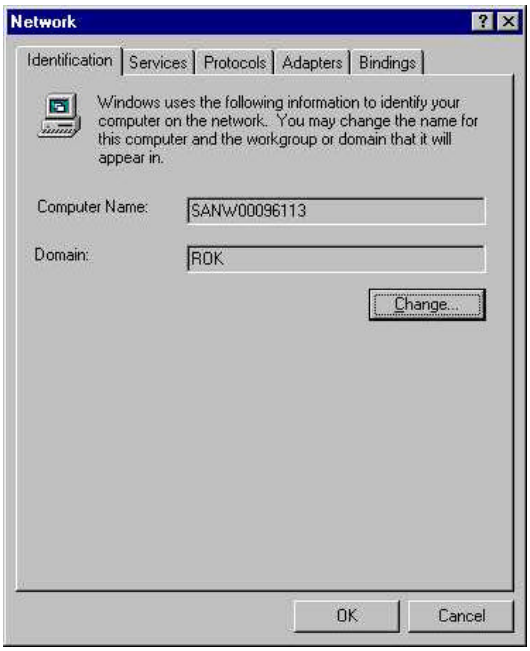

Figure 6-2. Network Dialog

At Network dialog, click on Protocols tab to display *Network Protocols:* selection window.

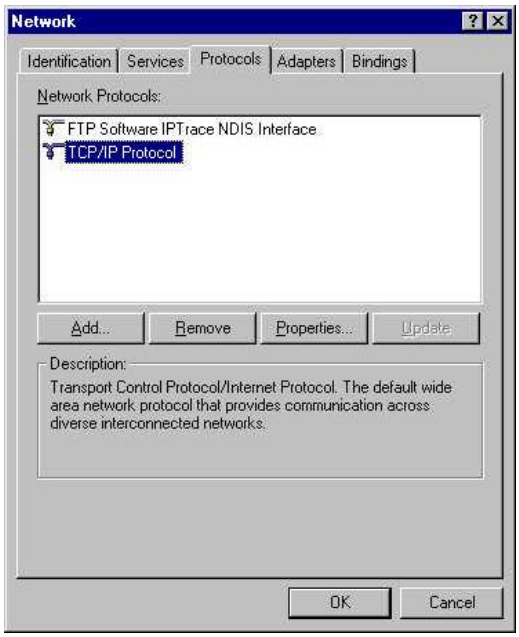

Figure 6-3. Network Protocols Selection Window

In *Network Protocols:* selection window, click on *TCP/IP Protocol,* then select Properties to display Microsoft TCP/IP Properties dialog (Figure 6-4. Microsoft TCP/IP Properties Dialog

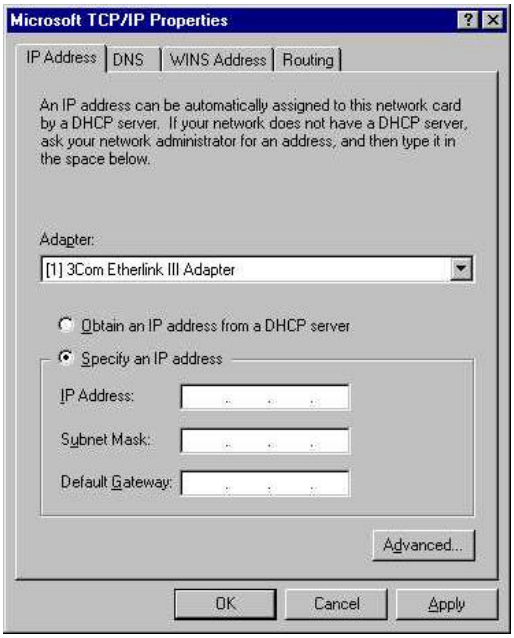

Figure 6-4. Microsoft TCP/IP Properties Dialog

In Microsoft TCP/IP Properties dialog (IP Address tab defaulted), click on Specify an IP Address button.

NOTE

Before changing any values, record the present values. You may have to re-enter them after the SPM is configured.

- In *IP Address:* box, enter an address that is 1 number higher than number you recorded from the SPM. For example: If the SPM has 10.10.117.21, enter 10.10.117.22.
- In *Subnet Mask:* box, enter a Subnet Mask number: Use 255.255.255.0.
- Leave *Default Gateway:* box blank.

In Microsoft TCP/IP Properties dialog, select DNS tab (see Figure 6-5. Microsoft TCP/IP Properties Dialog – DNS Tab

and disable DNS by highlighting IP Address in *DNS Service Search Order* window and then clicking Remove.

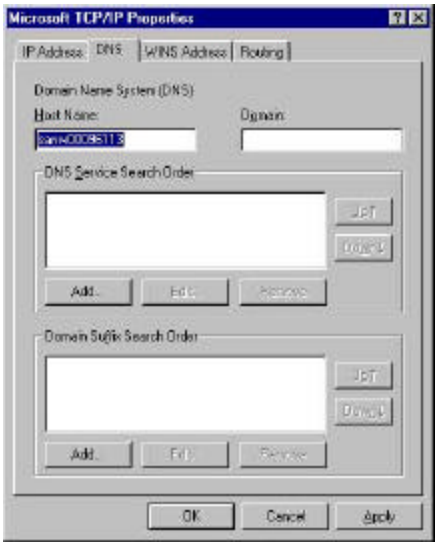

Figure 6-5. Microsoft TCP/IP Properties Dialog – DNS Tab

In Microsoft TCP/IP Properties dialog, select WINS Address tab (See Figure 6-6. Microsoft TCP/IP Properties Dialog – WINS Address Tab

and disable (uncheck) *Enable DNS for Windows Resolution* button.

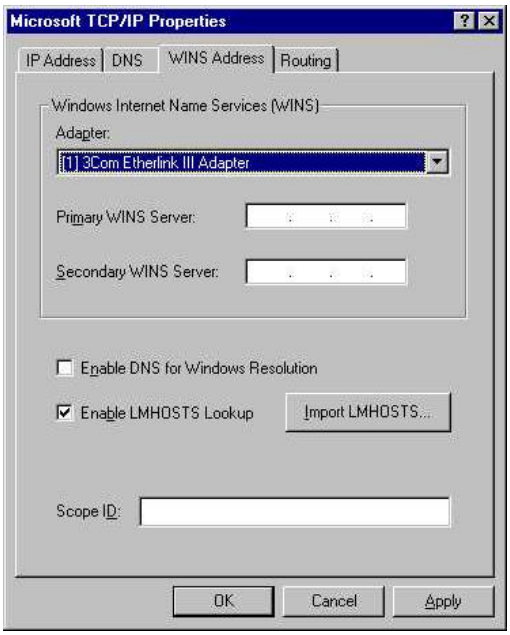

Figure 6-6. Microsoft TCP/IP Properties Dialog – WINS Address Tab

Click on OK to return to Protocols tab; then click OK again to get back to Windows NT Desktop.

Reboot computer so new IP address can take affect.

Modify Computer Configuration File (IPAddresses.txt)

- Launch the HUI software and select Edit-Edit IP Addresses. The IP Address editor will appear.
- Check to see if target or factory IP address(es) (that you recorded at the beginning of this section) is/are listed in file. If address(es) is/are not listed, add them by typing the IP address into the area provided (see Figure 3-3) and press the Add button.

Log Into SPM with HUI Software

At the Windows NT™ Desktop on your computer, double-click on the HRP User icon to start the HUI software. The HUI software is now running and the HRP User dialog is displayed (see Figure 3-1). Perform the following steps to log into a SPM and send commands to it:

At HRP User dialog, click down arrow on *IP Address:*. Locate and click on factory IP address of SPM.

Once IP Address has been selected, HRP Login dialog appears. Type password (default is **123**) and click OK. A message confirming the login will appear in the *HRP Response* window.

Commands may now be sent to the SPM.

6.1.5.2 Restore Computer TCP/IP Configuration

If required, the computer's settings that were changed in paragraph 6.1.5.1 have to be restored to their original settings. Refer to the settings previously recorded to change IP settings.

6.1.6 HUI Script Files

Script files are ASCII text files that contain commands a user would normally type in the *HRP Command:* text box. Script files are particularly useful when information is needed about a module or group of modules in the HRP. Script files are also useful when setting up the system. Table 6-1 describes some useful HUI script files. These are located in C:\config\Scripts.

Table 6-1. HUI Scripts

Script Filename	Script File Description
AutolevelParams.txt	Gets all autolevel related parameters
DisablePAs.txt	Disables all PAs
DLMParams.txt	Calls Hub and Remote DLM params scripts
EnableFaults.txt	Enables XTM, DLM, PA faults
EanblePAs.txt	Enables all PAs
GetOpenAlarms.txt	Retrieves all active alarms on the local SPM
HubDlmParams.txt	Gets all the Hub DLM parameters
LocalSpmParams.txt	Gets the parameters of the local SPM
RemDlmParams.txt	Gets all Remote DLM parameters
RevAgcParams.txt	Gets all autolevel related parameters
SetDlmGain.txt	Sets Hub and Remote DLM Attenuators
SetHrpGain.txt	Calls all "set gain and atten" scripts
SetHtmGain.txt	Sets up HTM Attenuators per installation guide
SetHubSpmGain.txt	Sets the Hub SPM Gain and Attenuator values
SetRemSpmGain.txt	Sets the Remote SPM Gain and Attenuator values
SetRtmGain.txt	Sets up RTM Attenuators per installation guide

7. COMMAND LINE INTERFACE (CLI)

The HRP User Interface software provides a command line interface for the user's computer to communicate with any Hub or Remote Subsystem on the user's network. Network communications with the HRPs are via a V.35 interface built into the SPM at the Hub. Portable computers at the tower site may communicate locally with a Hub or Remote SPM via the SPM's built-in ethernet interface.

7.1 HRP COMMAND LANGUAGE OVERVIEW

This section describes the Command Line Interface (CLI) protocol which is used to interface to the SPM software in the TransCell® 1900TM system. The protocol is ASCII based, with text messages transmitted to and from the SPM via TCP/IP. The CLI protocol is designed to allow for an orderly flow of information that is easier to understand when typing commands and when writing code to support the protocol.

This protocol has the following features:

- The delimiter between all fields is a space. This makes it easier to type commands at a prompt and also conforms to the Microsoft® Excel standard for reading table-based text files into a spreadsheet, which will be useful when evaluating message traffic logs.
- Any number of tabs or spaces may be used to delimit the fields in the message.
- A conscious effort has been made to eliminate the use of underscores ("_") in the field names of messages, since these characters can be cumbersome to type.
- The text-based fields of the message are case-insensitive.

NOTE

In the following HRP Command Language message descriptions, the square brackets used to delineate each field are not part of the actual message format.

Field Types

The following are the field types used in the messages. Keep in mind that not all messages use all of the fields. The specifics of a given message is dictated by the message type, the device, and the parameter of the message:

HEADER The HUI application prefixes a header field to all messages sent to the SPM for the purpose of synchronizing messages. This HEADER field is designated by a '$' before and after the header value. The SPM prefixes the same HEADER to the response message. The HEADER field is not echoed to any of the user displays.

RESPONSE This field indicates the type of response to an input message. The allowable types in this field are "REPORT", "CONFIRM" and "NACK". All negative responses will be in the form of a "NACK", requests for information will be responded to with a "REPORT", and successful sets/resets/commands will be responded to with a "CONFIRM".

TYPE This field indicates the intent of a request message. The following are the allowable message types: "SET", "GET", "RESET", "LOGIN", "LOGOUT", "WRITE", and "CLOSE" (for alarms).

DEVICE This field indicates the device (one only per message) that affects or is affected by this message. The only allowable device names are:

"HRP" (Hub-Remote-Pair)
"HUBSPM" (Hub-side SPM)
"REMSPM" (Remote-side SPM)
"LOCALSPM" ("this" side SPM)
"OTHERSPM" ("that" side SPM)
"HUBLVPS" (Hub Low Volt Power Supply)
"REMLVPS" (Remote Low Volt Power Supply)
"PSUPPLY" (Power Supply)
"HUBDLM" (Hub-side Datalink Module)
"REMDLM" (Remote-side DLM)
"HTM" (Hub Transceiver Module)
"RTM" (Remote Transceiver Module)
"PA" (Power Amplifier)
"AUTOLEVEL"
"TTA" (Tower Top Amplifier)

NOTE: "This" side refers to the SPM to which the user is locally connected and "that" side refers to the SPM that "this" side communicates to across the datalink.

PARAM This field indicates the parameter that is requested or transmitted in a given message. The use of this field is completely dependent on the device type. See the individual message type descriptions for valid parameter names.

CARRIER This field indicates the carrier that is requested in a message. For example, in a six-carrier system configuration, the only valid carrier values will be 1 through 6. Not all commands/messages use this field; it depends on the device/parameter that is being controlled.

VALUE This field indicates the value of the parameter for a given message. The use of this field is dependent on the message type, and possibly the parameter type. See the individual message type descriptions for valid value ranges.

ERROR This field provides the error codes that can be given in the NACK message.

EOM This is the end of message character, which for the HRP User Interface (HUI) is the sequence "\r\n". The EOM field is not echoed to any of the user displays.

7.2 COMMANDS

7.2.1 SET Message

The SET message is used to set the following parameters within an HRP:

- PCS Channel – Settable at HRP, Hub or Remote level
- Data Link Channel – forward or reverse, settable at HRP, Hub or Remote level
- Alarm Enable States – settable at HRP level only
- Thresholds – Alarms, faults
- Scheduled Events – Fault processing, watchdog, etc.
- Gender – Tells SPM if it is on Hub or Remote side

- HRP Identifier – 1 to 31 characters; user defined identifier; used in alarm reporting
- PA Enable State - Select by Remote Transceiver Module (RTM) number
- Attenuators – Forward; primary/diversity reverse; settable at HTM, RTM or Hub/Remote level; digital attenuators

The following describes the format of this message type:

- [HEADER]
- **"SET"**
- [DEVICE]
- [PARAM]
- [CARRIER] (possible, depends on parameter)
- [VALUE] (possible, depends on parameter)
- [MISC] (possible, depends on parameter)
- [EOM]

The response to this message by the SPM will contain the request message with either a "CONFIRM" or "NACK" field being inserted as the first field. In the case of the message being NACKed, the [ERROR] field will contain the error code(s) explaining why the message could not be processed. The following is the response template:

If command successful: [HEADER] **CONFIRM**: [ECHO OF REQUEST MESSAGE]
If command unsuccessful: [HEADER] **NACK**: [ERROR]

The following table defines the valid devices, parameters, carriers, and values that are allowed in the SET message. There is also a secondary field called "Misc" for any additional data. This field is displayed in the table below only if it is needed (it will also appear shaded):

Table 7-1. CLI Set Commands

Device	Parameter	Carrier	Value	Misc	Description
HRP	TDMACHAN	1 – 6	2 – 1998 (overall, limited by band)		Sets the HTM and RTM Channel and Updates the DDC/DUC Frequencies
HRP	DCCH		1 – 6		Sets the DCCH on the Hub and Remote
HRP	ALMSTATE		XXX	Y	XXX = Alarm Number, Y = 0/1 (off/on)
LOCALSPM	GENDER		HUB or REMOTE		Sets the Gender of this SPM
LOCALSPM	TIME		$0 – 2^{32}$		Set Time (Seconds since 1/1/1970) on this SPM
LOCALSPM	ID		1 – 31 chars		Sets the HRP ID of this SPM
LOCALSPM	DCCH		1 – 6		Sets the DCCH Carrier of this SPM
LOCALSPM	SHUTDOWN				Causes this Executive to Shutdown
HUBSPM	TIME		$0 – 2^{32}$		Set time (Seconds since 1/1/1970) on Hub SPM
HUBSPM	ID		1 – 31 chars		Sets the ID of the Hub SPM
HUBSPM	DCCH		1 – 6		Sets the DCCH on the Hub SPM
HUBSPM	REGISTER		Xxxxxxxx	yyyy	32-bit Address/16-bit Word to Write

Device	Parameter	Carrier	Value	Misc	Description
HUBSPM	FWGAIN	1 – 6	0 – 95.9		Sets DDC Gain on Main Path
HUBSPM	RFWGAIN	1 – 6	0 – 95.9		Sets DDC Gain on Redundant Path
HUBSPM	PRVATTEN	1 – 6	0 – 48		Sets DUC Attenuation
HUBSPM	DRVATTEN	1 – 6	0 – 48		Sets DUC Attenuation
HUBSPM	TEMPFAULTS				Sets the Hub SPM Temperature Faults
HUBDLM	FWCHAN		1,2,5,6 (A or B)		Sets Hub DLM Forward Channel
HUBDLM	RVCHAN		1,2,5,6 (A or B)		Sets Hub DLM Reverse Channel
HUBDLM	FWSTATE		0 – 1		Sets Forward Radio (0=off,1=on)
HUBDLM	RVSTATE		0 – 1		Sets Reverse Radio (0=off, 1=on)
HUBDLM	AUTOSYNC		0 – 1		Sets Auto Sync State (0=off, 1=on)
HUBDLM	FWATTEN		0 – 31		Sets Hub DLM Forward Attenuation
HUBDLM	FLTSTATES				Sets Hub DLM Faults (bitmap)
HUBDLM	LOOPBACK		0 – 1		Sets Loopback Enable State (0=off,1=on)
RAGC	HUBSTATE		0 – 1		Enables Hub Reverse AGC
RAGC	REMSTATE		0 – 1		Enables Remote Reverse AGC
RAGC	RATE		10 – 720		Sets Reverse AGC Rate (in minutes)
RAGC	SETPOINT		8 – 14		Sets Reverse AGC Setpoint (Hub)
RAGC	SECTORS		1 – 3		Sets Number of Sectors (Remote)
RAGC	TMAMODE		0 – 1		Enables/Disables TMA Mode (Remote)
RAGC	GO				Kicks off Reverse AGC
RAGC	HUBGO				Kicks off Reverse AGC (Hub)
RAGC	REMGO				Kicks off Reverse AGC (Remote)
RAGC	FLTSTATES				Sets Reverse AGC Faults (bitmap)
REMSPM	TIME		$0 – 2^{32}$		Set Time (Seconds since 1/1/1970) on Remote SPM
REMSPM	ID		1 – 31 chars		Sets the ID of the Remote SPM
REMSPM	DCCH		1 – 6		Sets the DCCH on the Remote SPM
REMSPM	REGISTER		Xxxxxxxx	yyyy	32-bit Address/16-bit Word to Write
REMSPM	FWATTEN	1 – 6	0 – 48		Sets DUC Attenuation (Main)
REMSPM	RFWATTEN	1 – 6	0 – 48		Sets DUC Attenuation (Backup)
REMSPM	PRVGAIN	1 – 6	0 – 95.9		Sets DDC Gain
REMSPM	DRVGAIN	1 – 6	0 – 95.9		Sets DDC Gain
REMSPM	TEMPFAULTS				Sets Remote SPM Temperature Faults
REMSPM	RVFILTER		Filter Name		Sets DDC Filter. Do **not** include pri/div.r0 in filter name
REMDLM	FWCHAN		1,2, 5,6 (A or B)		Sets Remote DLM Forward Channel
REMDLM	RVCHAN		1,2, 5,6 (A or B)		Sets Remote DLM Reverse Channel
REMDLM	FWSTATE		0 – 1		Sets Forward Radio (0=off,1=on)
REMDLM	RVSTATE		0 – 1		Sets Reverse Radio (0=off, 1=on)
REMDLM	AUTOSYNC		0 – 1		Sets Auto Sync State (0=off, 1=on)
REMDLM	RVATTEN		0 – 31		Sets Remote DLM Reverse Attenuation
REMDLM	FLTSTATES				Sets Remote DLM Faults (bitmap)
REMDLM	LOOPBACK		0 – 1		Sets Loopback Enable State (0=off,1=on)
HTM	TDMACHAN	1 – 6	2 – 1998 (overall, limited by band)		Sets HTM TDMA Channel and Updates the DDC/DUC Frequencies

Device	Parameter	Carrier	Value	Misc	Description
HTM	FWATTEN		0-15		Sets HTM Fwd Atten (Main Path)
HTM	RFWATTEN		0-15		Sets HTM Fwd Atten (Redundant Path)
HTM	PRVATTEN		UPPER or LOWER	0-15	Sets HTM Primary Reverse Attenuation
HTM	DRVATTEN		UPPER or LOWER	0-15	Sets HTM Diversity Reverse Attenuation
HTM	BAND		A – F		Set Band of HTM and Updates DDCs/DUCs with New Band Defaults
HTM	FLTSTATES				Sets HTM Faults (bitmap)
RTM	TDMACHAN	1 – 6	2 – 1998 (overall, limited by band)		Sets RTM TDMA Channel and Updates the DDC/DUC Frequencies
RTM	PRVATTEN		0 – 15		Sets RTM Primary Reverse Attenuation
RTM	DRVATTEN		0 – 15		Sets RTM Diversity Reverse Attenuation
RTM	BAND		A – F		Set Band of RTM and Updates DDCs/DUCs with New Band Defaults
RTM	FREQPLAN		A,B,C		Set Frequency Plan of RTM and Updates DDCs/DUCs with New Freqs
RTM	PRVTONE		0, 120.000-160.000		0 = Disable Tone, Any Other Value = Enable at Given Frequency
RTM	DRVTONE		0, 120.000-160.000		0 = Disable Tone, Any Other Value = Enable at Given Frequency
RTM	FLTSTATES				Sets RTM Faults (bitmap)
PA	STATE	1 – 6	0 – 1		Enable/Disable PA Unit (1 = enable)
PA	DLMLOCK		0 – 1		Notify PA if Link is Locked/Unlocked
PA	FLTSTATES				Sets PA Faults (bitmap)
HUBLVPS	FLTSTATES				Sets Hub LVPS Faults (bitmap)
REMLVPS	FLTSTATES				Sets Remote LVPS Faults (bitmap)
PSUPPLY	FLTSTATES				Sets Power Supply Faults (bitmap)
AUTOLEVEL	RATE		1 – 15		Rate (in minutes) at Which to Perform Autolevel Processing
AUTOLEVEL	STATE		0 – 1		Enable/Disable Autolevelling (1 = on)
AUTOLEVEL	GO				Kick off Autolevel Process
AUTOLEVEL	BACKOFF		1.0 – 5.0		Set Autolevel Backoff Level
AUTOLEVEL	SETPOINT		40.0 – 50.0		Set Autolevel Setpoint Value
AUTOLEVEL	TOLERANCE		0.0 – 1.0		Set Autolevel Setpoint Tolerance Value
FCONT	STATE		0 – 1		Enable/Disable Forward Continuity
FCONT	GO				Kick off Forward Continuity Cycle
RCONT	STATE		0 – 1		Enable/Disable Reverse Continuity
RCONT	GO				Kick off Reverse Continuity Cycle

7.2.2 GET Message

The GET message is used to get following parameters within HRP.

- PCS Channel

- Data Link Channel – forward/reverse channel, lock state, Bit Error Rate
- Alarm Enable States
- HRP Identifier
- Temperature Values – HTM, RTM (Fwd, Rev, PA)
- Attenuator Power Values – Forward; primary/diversity reverse; request at a HTM, RTM, Hub/Remote level; digital attenuators
- Software Revisions – HTM, RTM, SPM
- PA – State (on/off); power

The following describes the format of this message type:

- [HEADER]
- **"GET"**
- [DEVICE]
- [PARAM]
- [CARRIER] (possible, depends on parameter)
- [VALUE] (possible, depends on parameter)
- [EOM]

The return message type will be one of two types: either "REPORT" if successful or "NACK" if unsuccessful. In the case of a "REPORT" return, the return value(s) will be indicated in the [VALUE] field. In the case of a "NACK" return (either because of an invalid request format or some other processing reason), the error code(s) will be indicated in the [ERROR] field. The return message will take on the following form:

If command successful: [HEADER] **REPORT:** [VALUE]
If command unsuccessful: [HEADER] **NACK:** [ERROR]

For some cases of successful "GET LOCALSPM" type commands, the response format will be slightly modified to accommodate the HUI software:

[HEADER] **REPORT** [PARAM]**:** [VALUE]

The following table defines the valid devices, parameters, indices, and values that are allowed in the GET message:

Table 7-2. CLI Get Commands

Device	Parameter	Carrier	Value	Return Values
HRP	TDMACHAN	1 – 6		TDMA Channel – Validation is Done to be Sure that Both Sides are Synched
HRP	DCCH			System DCCH – Validation is Done to be Sure that Both Sides are Synched
HRP	ALMSTATE		XYZ	HRP Alarm State (1 = on) Corresponding to Alarm Number XYZ
LOCALSPM	GENDER			"HUB" or "REMOTE" from this SPM
LOCALSPM	VERSION			Executive Software Version of this SPM
LOCALSPM	ID			User Defined ID of this SPM

Device	Parameter	Carrier	Value	Return Values
LOCALSPM	TIME			Time (in Seconds) of this SPM
LOCALSPM	DCCH			The DCCH Carrier set on this SPM
LOCALSPM	OPENALMS			All ***Potential*** Alarms from this SPM
LOCALSPM	PRIVLEVEL			The Current Privilege Level of Logged In User
OTHERSPM	GENDER			"HUB" or "REMOTE" from "that" SPM
OTHERSPM	VERSION			Executive Software Version of "that" SPM
OTHERSPM	ID			User Defined ID of "that" SPM
OTHERSPM	TIME			Time (in Seconds) of "that" SPM
OTHERSPM	DCCH			The DCCH Carrier set on "that" SPM
HUBSPM	TIME			Time (in Seconds) of Hub SPM
HUBSPM	DCCH			Hub SPM DCCH (1 – 6)
HUBSPM	ID			Hub ID (auto-updated by SEM)
HUBSPM	VERSION			Hub Executive Software Version
HUBSPM	FWGAIN	1 – 6		Hub DDC (Forward Main) Gain
HUBSPM	RFWGAIN	1 – 6		Hub DDC (Forward Redundant) Gain
HUBSPM	PRVATTEN	1 – 6		Hub DUC (Primary Reverse) Attenuation
HUBSPM	DRVATTEN	1 – 6		Hub DUC (Diversity Reverse) Attenuation
HUBSPM	FWFREQ	1 – 6		Hub DDC (Forward Main) Frequency
HUBSPM	RFWFREQ	1 – 6		Hub DDC (Forward Redundant) Frequency
HUBSPM	PRVFREQ	1 – 6		Hub DUC (Primary Reverse) Frequency
HUBSPM	DRVFREQ	1 – 6		Hub DUC (Diversity Reverse) Frequency
HUBSPM	FWPOWER	1 – 6		Hub DDC (Forward Main) Power
HUBSPM	RFWPOWER	1 – 6		Hub DDC (Forward Redundant) Power
HUBSPM	PRVPOWER	1 – 6		Hub DUC (Primary Reverse) Power
HUBSPM	DRVPOWER	1 – 6		Hub DUC (Diversity Reverse) Power
HUBSPM	TEMP			Hub SPM Temperature
HUBSPM	TEMPFAULTS			Hub SPM Temperature Fault States (bitmap)
HUBSPM	REGISTER		xxxxxxxx	Hub FPGA Address value. Given a 32-bit Hex Address (xxxxxxxx), Returns a 16-bit Value.
HUBDLM	FWCHAN			Hub DLM Forward Channel
HUBDLM	RVCHAN			Hub DLM Reverse Channel
HUBDLM	BERONE			Hub DLM One Sample Bit Error Rate
HUBDLM	BERTEN			Hub DLM Ten Sample Bit Error Rate
HUBDLM	BERACCUM			Hub DLM Accumulated Bit Error Rate
HUBDLM	LOCK			Hub DLM Lock State (1 = locked)
HUBDLM	FWSTATE			Hub DLM Forward Radio (1 = enabled)
HUBDLM	RVSTATE			Hub DLM Reverse Radio (1 = enabled)
HUBDLM	AUTOSYNC			Hub DLM Auto Sync (1 = enabled)
HUBDLM	FLTSTATES			Hub DLM Fault States (bitmap)
HUBDLM	FWATTEN			Hub DLM Forward Attenuation Value
HUBDLM	FWPOWER			Hub DLM Forward Power Value
HUBDLM	LOOPBACK			Hub Loopback Enable State (0=off,1=on)
RAGC	HUBSTATE			Hub Reverse AGC State
RAGC	REMSTATE			Remote Reverse AGC State

Device	Parameter	Carrier	Value	Return Values
RAGC	RATE			Reverse AGC Rate (in minutes)
RAGC	SETPOINT			Reverse AGC Setpoint (Hub)
RAGC	SECTORS			Number of Sectors (Remote)
RAGC	TMAMODE			TMA Mode (Remote)
RAGC	FLTSTATES			Reverse AGC Faults (bitmap)
REMSPM	TIME			Time (in Seconds) of Remote SPM
REMSPM	DCCH			Remote SPM DCCH (1 – 6)
REMSPM	ID			Remote ID (auto-updated by Hub Executive)
REMSPM	VERSION			Remote Executive Software Version
REMSPM	FWATTEN	1 – 6		Remote DUC (Forward Main) Attenuation
REMSPM	RFWATTEN	1 – 6		Remote DUC (Forward Redundant) Attenuation
REMSPM	PRVGAIN	1 – 6		Remote DDC (Primary Reverse) Gain
REMSPM	DRVGAIN	1 – 6		Remote DDC (Diversity Reverse) Gain
REMSPM	FWFREQ	1 – 6		Remote DUC (Forward Main) Frequency
REMSPM	RFWFREQ	1 – 6		Remote DUC (Forward Redundant) Frequency
REMSPM	PRVFREQ	1 – 6		Remote DDC (Primary Reverse) Frequency
REMSPM	DRVFREQ	1 – 6		Remote DDC (Diversity Reverse) Frequency
REMSPM	FWPOWER	1 – 6		Remote DUC (Forward Main) Power
REMSPM	RFWPOWER	1 – 6		Remote DUC (Forward Redundant) Power
REMSPM	PRVPOWER	1 – 6		Remote DDC (Primary Reverse) Power
REMSPM	DRVPOWER	1 – 6		Remote DDC (Diversity Reverse) Power
REMSPM	TEMP			Remote SPM Temperature
REMSPM	TEMPFAULTS			Remote SPM Temp Fault States (bitmap)
REMSPM	REGISTER		xxxxxxxx	Remote FPGA Address Value. Given a 32-bit Hex Address (xxxxxxxx), Returns a 16-bit Value
REMSPM	RVFILTER			DDC Filter Name
REMDLM	FWCHAN			Remote DLM Forward Channel
REMDLM	RVCHAN			Remote DLM Reverse Channel
REMDLM	BERONE			Remote DLM One Sample BER
REMDLM	BERTEN			Remote DLM Ten Sample BER
REMDLM	BERACCUM			Remote DLM Accumulated BER
REMDLM	LOCK			Remote DLM Lock State (1 = locked)
REMDLM	FWSTATE			Remote DLM Forward Radio (1 = enabled)
REMDLM	RVSTATE			Remote DLM Reverse Radio (1 = enabled)
REMDLM	AUTOSYNC			Remote DLM Auto Sync (1 = enabled)
REMDLM	FLTSTATES			Remote DLM Fault States (bitmap)
REMDLM	RVATTEN			Remote DLM Reverse Attenuation Value
REMDLM	RVPOWER			Remote DLM Reverse Power Value
REMDLM	LOOPBACK			Loopback Enable State (0=off,1=on)
HTM	TDMACHAN	1 – 6		HTM TDMA Channel and DDC/DUC Freqs
HTM	FWATTEN			HTM Forward Main Attenuation
HTM	RFWATTEN			HTM Forward Redundant Attenuation
HTM	PRVATTEN		UPPER or LOWER	HTM Primary Reverse Attenuation

Device	Parameter	Carrier	Value	Return Values
HTM	DRVATTEN		UPPER or LOWER	HTM Diversity Reverse Attenuation
HTM	PRVPOWER		UPPER or LOWER	HTM Primary Reverse Power
HTM	DRVPOWER		UPPER or LOWER	HTM Diversity Reverse Power
HTM	TEMP			HTM Temperature
HTM	BAND			HTM TDMA Band (A – F)
HTM	FLTSTATES			HTM Fault States (bitmap)
RTM	TDMACHAN	1 – 6		RTM TDMA Channel and DDC/DUC Freqs
RTM	PRVATTEN			RTM Primary Reverse Attenuation
RTM	DRVATTEN			RTM Diversity Reverse Attenuation
RTM	FWPOWER	1 – 6		RTM Forward Power
RTM	TEMP			RTM Temperature
RTM	FREQPLAN			RTM Frequency Plan (A – C)
RTM	BAND			RTM TDMA Band (A – F)
RTM	FLTSTATES			RTM Fault States (bitmap)
RTM	PRVTONE			Frequency (in MHz) of Primary Test Tone (0=Tone disabled)
RTM	DRVTONE			Frequency (in MHz) of Diversity Test Tone (0=Tone disabled)
PA	TEMP	1 – 6		PA Temperature
PA	STATE	1 – 6		PA State (1 = enabled)
PA	FWPOWER	1 – 6		PA Forward Power Value
PA	VOLTAGE	1 – 6		PA Input Voltage Reading
PA	POSITION	1 – 6		PA Position in Rack
PA	HWREV	1 – 6		PA Hardware Revision Information
PA	SWREV	1 – 6		PA Software Revision Information
PA	SERIALNUM	1 – 6		PA Serial Number
PA	FLTSTATES			PA Fault States
HUBLVPS	FLTSTATES			Hub LVPS Fault States (bitmap)
REMLVPS	FLTSTATES			Remote LVPS Fault States (bitmap)
PSUPPLY	FLTSTATES			Power Supply Fault States (bitmap)
AUTOLEVEL	RATE			Rate (in minutes) Autolevel Process is Run
AUTOLEVEL	STATE			Autolevel Process State (1 = enabled)
AUTOLEVEL	BACKOFF			Autolevel Backoff Value
AUTOLEVEL	SETPOINT			Autolevel Setpoint
AUTOLEVEL	TOLERANCE			Autolevel Setpoint Tolerance
FCONT	STATE			Forward Continuity Enable State
RCONT	STATE			Reverse Continuity Enable State

7.2.3 RESET Message

This message is used to reset a given device. This request from the user will take on the following form:

- [HEADER]
- **"RESET"**
- [DEVICE]
- [PARAM]
- [CARRIER] (possible, depends on device)
- [EOM]

The following table defines the valid devices, parameters, indices, and values that are allowed in the RESET message:

Table 7-3. CLI Reset Commands

Device	Parameter	Carrier
HUBSPM	FWPATH	
HUBSPM	RVPATH	
HUBDLM	DEVICE	
HUBDLM	BERCOUNT	
REMSPM	FWPATH	
REMSPM	RVPATH	
REMDLM	DEVICE	
REMDLM	BERCOUNT	
HTM		
RTM		
PA		1 – 6
TTA		
AUTOLEVEL	BACKOFF	

In this message, FWPATH, PRVPATH, and DRVPATH on either the HUB-side or REMOTE-side SPM refers to the resetting of the DDCs and DUCs.

The AUTOLEVEL BACKOFF reset command will override the one-time autolevel adjustment.

The response to this message by the SPM will contain the request message with either a "CONFIRM" or "NACK" field being inserted as the first field. In the case of the message being NACKed, the [ERROR] field will contain the error code(s) explaining why the message could not be processed. The following is the response template:

If command successful: [HEADER] **CONFIRM:** [ECHO OF REQUEST MESSAGE]

If command unsuccessful: [HEADER] **NACK:** [ERROR]

7.2.4 LOGIN Message

This message is used to allow the user to log in to the HUI. The software design requires that a user be logged in before being allowed to monitor and control the system. (The only exception to this is the use of certain "GET LOCALSPM" type messages). The user will enter a password in the [VALUE] field. The LOGIN request will take on the following form:

- [HEADER]
- **"LOGIN"**
- "LOCALSPM"
- [VALUE]
- [EOM]

The VALUE field will contain the password, which will be hard-coded in the SPM, some alphanumeric string of 6 to 8 characters. There are currently two passwords allowed: one which allows for "read-only" access and one which allows for "read-write" access.

The response to this message by the SPM will contain the request message with either a "CONFIRM" or "NACK" field being inserted as the first field. In the case of the message being NACKed, the [ERROR] field will contain the error code(s) explaining why the message could not be processed. The following is the response template:

If command successful: [HEADER] **CONFIRM:** [ECHO OF REQUEST MESSAGE]

If command unsuccessful: [HEADER] **NACK LOGIN:** [ERROR]

7.2.5 LOGOUT Message

This message is used to log-out of the HRP. This command allows the SPM software to reset the communications port and configure it to listen for a new LOGIN message. The form of this message will be as follows:

- [HEADER]
- **"LOGOUT"**
- "LOCALSPM"
- [EOM]

The response to this message by the SPM will contain the request message with either a "CONFIRM" or "NACK" field being inserted as the first field. In the case of the message being NACKed, the [ERROR] field will contain the error code(s) explaining why the message could not be processed. The following is the response template:

If command successful: [HEADER] **CONFIRM:** [ECHO OF REQUEST MESSAGE]

If command unsuccessful: [HEADER] **NACK LOGOUT:** [ERROR]

7.2.6 CLOSE Message

This message is used to allow the closing of alarms designated as "user-closeable". The form of this message is as follows, where the [VALUE] field contains the alarm ID and the [MISC] field contains the fault ID:

- [HEADER]

- **"CLOSE"**
- "HRP"
- "ALARM"
- [VALUE]
- [MISC]
- [EOM]

The response to this message by the SPM will contain the request message with either a "CONFIRM" or "NACK" field being inserted as the first field. In the case of the message being NACKed, the [ERROR] field will contain the error code(s) explaining why the message could not be processed. The following is the response template:

If command successful: [HEADER] **CONFIRM:** [ECHO OF REQUEST MESSAGE]

If command unsuccessful: [HEADER] **NACK:** [ERROR]

7.2.7 WRITE Message

This message is used to write the logs that are stored in SPM RAM out to SPM flash. It is not desirable to do this on a persistent basis, as the flash units can only handle a limited amount of writes. The form of this message is as follows, where the [VALUE] field contains the alarm ID:

- [HEADER]
- **"WRITE"**
- "LOCALSPM"
- [PARAM]
- [EOM]

Currently, the only allowed parameter is "CMDLOG", which is a log that stores all messages sent from/to the HUI to/from the Executive software in the SPM.

The response to this message by the SPM will contain the request message with either a "CONFIRM" or "NACK" field being inserted as the first field. In the case of the message being NACKed, the [ERROR] field will contain the error code(s) explaining why the message could not be processed. The following is the response template:

If command successful: [HEADER] **CONFIRM:** [ECHO OF REQUEST MESSAGE]

If command unsuccessful: [HEADER] **NACK:** [ERROR]